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"ROARING."*

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THE term "Roaring" comes down to us from the past, when a concise, graphic, and forcible style of nomenclature was in vogue; it covers a number of ailments—all, I might say, in which a roaring noise is made in respiration.

It may be due to acute inflammatory action, as in Laryngitis; tumefaction, as in Strangles and sub-maxillary abscess; nervous, as in "Laryngismus stridulus" or spasm of the glottis, and "Laryngismus paralyticus" of Fleming—atrophy of laryngeal muscles. This latter is the general form, and the one we purpose considering most fully.

In excessive "roarers," or, as the horse-dealers call them, "belloned bulls," the noise is not due to paralysis of the laryngeal muscles, although this may be associated with the other causes. Tumours falling into the glottidean opening: the roaring in these cases will be either constant, or, if intermittent, liable to recur with change of position of the head. Disease of the heart and lungs: Percivall refers to a case of the latter. I have also seen several in which the animal, when quiet, appeared perfectly normal, but on slight exercise, dyspnœa and loud roaring occurred. Such cases are not common, and a mistake in diagnosis may easily be made, the breathing simulating that produced by obstruction in the larynx or trachea, far more so than the dyspnœa due to destruction of lung tissue.

Fracture of the rings of the trachea is, in my opinion, the most general cause; two cases of recent occurrence are instructive. No. 1. The driver of a dapple-grey cart-horse belonging to a firm in this city, complained of his horse refusing to work, and if excited or urged at once commenced to roar. Up to this period he

* Read before the Lancashire Veterinary Association.

had been a good worker and sound in his wind; there had been no sickness. The suddenness of the attack led me to doubt its being a true case of Laryngismus paralyticus. No improvement following the operation of tracheotomy clearly demonstrated the fact that the obstruction must be below the seat of operation. Careful examination revealed longitudinal fracture and lateral collapse of two rings of the trachea as it entered the chest, below where the collar comes. Not being able to devise any means whereby the animal could be rendered useful, we obtained the owner's permission to verify the diagnosis by a *post-mortem* examination. I had the specimen, but am sorry to say it has been borrowed, I fear without my permission, and its return is problematical, so I have manufactured an artificial one. No. 2. Also a grey horse bought by a small farmer from a well-known low-class horse-dealer; he afterwards ascertained that this horse had travelled from fair to fair. In hand the animal ran fairly well, but was utterly useless for harness, as directly the collar pressed it began to roar, and exhibited extreme dyspnœa. This was due to the same abnormal state of the trachea as the other. The owner being poor, he would not consent to have it destroyed, and the animal resumed its peregrinations. In neither case were any marks of external injury visible, but I am inclined to think the collar may possibly cause these injuries.

Cause of Laryngismus Paralyticus first discovered.—Roaring due to atrophy of certain muscles or "laryngismus paralyticus" of Fleming (a term more in keeping with modern scientific nomenclature, but having one serious defect, its length), was first noticed during the earlier part of this century, when a pallid and wasted state of certain muscles of the larynx of roarers was observed. Youatt, in a work published in 1831, says: "Roaring is due to inflammation; a fluid rapidly changing into a tough viscid substance is thrown out, sometimes running across the larynx in bands. We believe this to be the most general cause of the disease. Much light has, however, lately been thrown on other causes of this complaint. Many roarers have been examined after death, and no vestige of these bands has been found." Youatt then tries to make *post-mortem* appearances fit in with a new theory he held as to the cause of the disease, by saying "the larynx and upper part of the windpipe are materially deformed, crooked, and compressed; caused by the use of the bearing-rein," though nothing is said about wasted or atrophied muscles; but in 1853 Percivall mentions Youatt referring to it in his lectures, published in the *Veterinarian*, as follows: "Some years have now elapsed since it was first discovered that the larynges of roarers occasionally presented the singular phenomenon of the muscles of one side

being wasted away or absorbed." We may conclude from the foregoing that somewhere from about 1836 to 1850, the atrophy of the laryngeal muscles was first noticed, at any rate in England.

Roaring and its causes was evidently exercising the minds of veterinary surgeons in those days, and I doubt if we know now very much more of its primary cause than they did.

As far back as 1826, Dupuy had published an account of experiments showing that compression or division of the recurrent nerve produced roaring. In 1837, Field, of London, divided the nerve on the right side, in a farm-horse, and produced acute Roaring. After three years he killed the animal, and found the muscles supplied by the divided nerve were atrophied. Barlow, of the Dick College, Edinburgh, also by further experiments confirmed these results.

Division of the motor nerve supplying any muscle is followed by atrophy of that muscle. These experiments prove, 1st, That the crico-arytenoideus posticus, crico-arytenoideus lateralis, arytenoideus, and the thyro-arytenoideus muscles are supplied by the inferior laryngeal nerve (recurrent), because these are the muscles we find atrophied after the division of this nerve, independently of tracing the nerve to its terminations. 2nd, We find that these same muscles are wholly or partially atrophied on the left side in cases of Laryngismus paralyticus, and if the condition be of sufficiently long standing, it is complete; as in the specimen shown, in which not a trace of true muscular tissue remains. Thus far, it is clear that Laryngismus paralyticus is due to a defective or diseased state of the inferior laryngeal nerve. There is still uncertainty as to what is the exact cause or state of this nerve resulting in Laryngismus paralyticus.

In some extremely bad cases, the inferior laryngeal nerve exhibits unmistakable evidence of disease to the naked eye. Mr. Moore tells me of a five-year old Clydesdale stallion destroyed as useless, being such a bad roarer, in which the nerve was deepened in colour and there was effusion along its whole course.

The atrophy is not always confined to the left side; the right is at times also atrophied, but to a lesser degree; whilst cases occasionally occur of Roaring, in which no atrophy is found (Williams supports me in this); it may be due to defective nerve stimulus, but not of sufficiently long standing for the atrophy to have taken place.

Why the left nerve is generally affected may possibly be accounted for when the pathology is better known. The French veterinarians give three reasons why it is most often affected, but to me they are not satisfactory, and can easily be refuted. 1st. The recurrent, after being given off from the pneumogastric on the left

side, passes round the aorta, the pulsation of the artery producing the paralysis. If this were the cause, Roaring would become constant, or at any rate more general. 2nd. As it passes over the bronchial glands at the root of the lungs, enlargement of these glands pressing on the nerve. Cobs and ponies which do not become roarers, suffer from affections producing this enlargement equally with larger horses. 3rd. As the nerve passes up the neck on the left side it is more exposed, being placed more superficially on account of the œsophagus. This is also constant. Why should the injuries always be confined to a certain class of animals?

How does the Atrophy produce the Roaring?—If you dilate the larynx you will find the vocal cord becomes tense and lies close to the side of the organ; but when the muscles are atrophied they do not draw the cartilages apart, which action tightens and renders tense the vocal cord; hence the obstruction to the passage of the air, and a roaring noise is the result in accelerated respiration.

Fleming dilates on this relaxed vocal cord in his article on "Laryngismus Paralyticus," in the Veterinary Journal for February, 1882, and in correspondence recently with him *re* Roaring, he says, "I am now working at Roaring, and hope to cure it effectually by a new and simple operation. I have settled its pathology and causation." Possibly the simple operation here referred to may be the removal of the relaxed vocal cord. Whistling is often only modified Roaring.

Causes.—Haycock, writing in 1861, speaks of Spooner doubting whether the atrophied muscles were the cause, or the result of Roaring. The primary affection is undoubtedly neurotic, the progressive muscular atrophy secondary. A thorough knowledge of Roaring would imply the understanding of one of the delicate changes taking place in a nerve, so difficult to master physiologically, but producing palpable results in the functional activities. I leave the morbid change in the nerve tissue, admitting a lack of knowledge, and turn to consider the predisposing and exciting causes under the following heads:—

1st, Hereditary. 2nd, Climatic. 3rd, Dietetic. 4th, Accidental.

1*st Hereditary*.—Much attention has been given to the breeding of horses in the British Isles. This, with climate and our love of horses, has resulted in qualities and appearances commanding for them a world-wide fame. On the other hand, considering the haphazard way in which many are bred, it is a wonder we possess such good animals as we do. In a state of nature, the law of "the survival of the fittest" plays an important part; but as the flora is improved by cultivation, so is the equine species.

Breeding may be reduced to a science, but there is a danger that in striving after some form of excellence, we may at the same

time be cultivating a weakness or defect. Let me illustrate this by reference to "Ormonde," the celebrated racehorse of the Duke of Westminster, with an unbeaten record on the turf, and the most brilliant horse of his day, but he is affected with congenital progressive muscular atrophy of the muscles of his larynx. His dam, "Lily Agnes," suffers from the same malady, and has transmitted it to her illustrious son, who will again, no doubt, if used for stud purposes, produce a percentage of roarers. If His Grace the Duke will be so advised, I trust that he will sacrifice, and lose the horse's otherwise brilliant transmissible qualities, rather than increase our stock of roarers. The temptation to the owner of any valuable pedigree animal to adopt the alternative course is obvious.

If we look at horses most affected, you will see it runs in certain strains, and in pedigree stock its hereditary character is most conclusively shown.

Cleveland bay, coaching-like horses, Shire and Clydesdale cart-horses, hunters and van-horses appear to be most disposed to the affection.

A fruitful source of transmission to our half-bred stock has been the use of thoroughbred horses, cast as roarers, becoming country stallions.

In breeding, as we improve the size and conformation, we also increase the tendency to unsoundness of wind. Taking 15-2 hands as a medium height of the horse, we rarely find one under that affected with Laryngismus paralyticus, whilst (with age) when over that height a heavy percentage are unsound. This has been established by investigations undertaken for this paper.

Little horses are very rarely affected, and in offspring from the same parents, if one be small and the other big, the Roaring will be developed in the latter and not the former; but I believe if the small one be bred from and should breed a big one, even if the mate be sound, the tendency to Roaring will return. I have a striking instance in a bay mare, 15-1½ hands high, and which I have, as some of you know, hunted for the last eight or nine seasons; her half brother and sister, 16 hands high, were both roarers, whilst their dam was sound; and "Spoonstealer," the sire of all, was also a good-winded horse. Size, as affecting Laryngismus paralyticus, is a difficulty, and, as I said with reference to the left side being most often the affected one, possibly a better knowledge of the pathology will be the only elucidation.

Mares are said to be not so frequently affected as entires and geldings, though many mares are roarers.

Climatic.—Next to hereditary cause, I should place climatic; the former as a predisposing, the latter as an exciting cause. I

must here acknowledge my indebtedness to Messrs. Fleming, Meyrick, and others, who have furnished me, both directly and indirectly, with information on this part of the subject. They are all agreed as to its being almost an unknown disease in Eastern countries and hot climates, amongst the native-bred horses. Exception is taken to Egypt, but the horses there are all imported.

For the animal with a predisposition to Roaring, nothing more surely develops it than climatic change. Irish horses brought to England all suffer from the change, and a heavy percentage are left unsound in their wind. Perhaps the exceptions are most often met with when animals are in hard condition, and what horsemen term "very fit," either for racing or hunting. Ireland is essentially a moist climate, and many horses bred there become roarers, but whether from climatic or hereditary cause (the latter I think), or both, I have not been able to thoroughly satisfy myself. The ease with which some Irish horses obtain their pedigree has been a serious obstacle to obtaining reliable information. In Manchester, with its unpleasant climate, the horses suffer from excess of diseases of the respiratory organs. With scarcely an exception, every young fresh horse from the country suffers either from feverish catarrh, Pneumonia, Pleurisy, Bronchitis, Laryngitis, or Strangles. Many of them afterwards are found to be roarers, but it being a flat district they perform ordinary harness and draught work fairly satisfactorily. Their number is doubtlessly augmented from hilly districts, where they are useless. The most serious loss occasioned by Roaring is undoubtedly amongst racing, hunting, high-class harness and heavy draught horses.

In a moist climate with malaria or impure atmosphere, Roaring becomes common, in large horses particularly. It was rumoured that, at the Cape, horses unsound here had become sound there. Against this I place the reply I received from the Principal Veterinary Surgeon to the Army, who says, "Large numbers of the 17th Lancers' horses (English) became roarers during the Zulu war." Mr. Meyrick, C.B., in answer to my enquiries, gives the following as his experience:—"I believe that in Eastern countries, as a rule, Roaring is very uncommon. During twelve years' Indian service, I met with only one case that I can remember, but it was a very bad one. The animal, a remarkably well-shaped Australian horse, had been imported only a short time, and was found to be a roarer immediately after joining a battery of which I was in charge. Whilst looking after various batteries of artillery, regiments of cavalry, and Government studs, as well as while superintending the horse-breeding operations of the Punjaub, I had to inspect stud-bred and country-bred horses in tens of thousands, Australians in hundreds, and a few scores of horses

from Cabul and Central Asia, besides many hundreds of Arabs and Persians Among all these, as before remarked, I never met with one roarer except the Australian. It is, of course, just possible that some might have been affected, but so slightly as not to attract the attention of the officer in charge of them. Egypt seems to be a remarkable exception to the rule. There Roaring is far more common than in England. In the streets of Cairo, Arab or Syrian horses can be heard to roar while drawing the carriages of the gentry. Shortly after our army reached Cairo at the latter end of 1882, a severe form of Fever, resembling Anthrax in many respects, broke out amongst the horses, many hundreds of them being attacked. Within two or three months after this outbreak subsided, it was found that an extraordinary number of the horses had become roarers. All except a few had been treated for the Fever, and I am inclined to think that these few had also been affected, but in so slight a form as to escape notice. In some cases the only symptoms observable were a quickened pulse and breathing, with a yellow tinge of the mucous membranes and loss of appetite. As more than half of the private soldiers, and likewise the veterinary surgeons, were in hospital, those left had so many animals to attend that slight cases of illness might easily have been overlooked. On making *post-mortem* examinations of some of those which died, I found infiltrations of lymph in various parts of the body. Possibly the Roaring may have been caused by the pressure of some of these deposits upon the nerves supplying the larynx. I afterwards found that a similar fever is present nearly or quite every year in Egypt, and it may perhaps be the cause of the Syrian and Arab horses there so frequently becoming roarers. The cause of the fever I believe to be malarious, depending upon the annual overflow of the Nile, and aggravated by the absence of sanitary arrangements throughout the country. After several months, many of the roarers completely recovered, while others remained in the same condition or became worse, and had to be cast from the army. I found many instances of horses being cast for Roaring more than two years after they returned to England, so gradually did they deteriorate. Small horses are, according to my experience, less frequently affected with Roaring than large ones. In Egypt, it may be said that, practically, all horses are imported, the country being so ill-adapted to them that few are bred in the cultivated parts. In the deserts the Bedouins breed some, but the desert can hardly be called Egypt proper. I never met with a case of hereditary Roaring in India, there being no roarers among either the stallions or brood mares of the studs to which I was attached.

"I should add that I have only served in the Bengal Presidency, but have been in every part of it from Calcutta to Peshawar. Mr.

Steel, late I.V.S., served in Bombay, and I understood him to say that he had met with a few cases of Roaring in that Presidency; but he quite agrees as to the general exemption of Eastern horses from it. It is certainly remarkable that I did not meet with any Roaring among the stud-breds, because Strangles is said to be one cause in England, and that disease used to prevail in a severe form in the Government studs of Bengal (owing to the large number of young stock collected in them), in spite of most ample ventilation and other sanitary measures. Veterinary Surgeon Glover, of the Veterinary Department, tells me he knew a few instances of Roaring among the Australian racers in India (called Walers), but he had never met with Roaring among stud-breds or country-breds."

In the VETERINARY JOURNAL for July, 1887, R. Spooner Hart, of Calcutta, holds that "Roaring is the result, in the majority of instances, of exalted body temperature, such as occurs in hunters and race-horses during training and galloping, and in the class of cases known as Thermic Fever (sunstroke). Both Roaring and 'gone in the loins' are common sequelæ of such attacks, and are specially liable to result from training in clothing. Roaring is very common in Calcutta, and is most often observed in the coarse-bred horses which can least withstand the heat, and seem to be constantly in a state of fever." If this be correct, they must have imported to Calcutta, along with the coarseness, Roaring.

The Roaring resulting from sunstroke should not be confounded with hereditary, progressive, muscular atrophy, which is found in the Australian horses, and is inherited from their ancestors of British and European origin. This hereditary form is most common in the west, where the breed of horses is larger, and is gradually extending east, *viâ* the Antipodes.

Dietetic.—A plethoric state is dangerous in all cases in which there is the hereditary taint or predisposition on account of size. Hunters, if turned out to grass for the summer, often come up roarers; it also supervenes in heavy draught horses after a run at grass. I incline to the opinion that these cases are rather due to the changes of temperature and heavy dews, than to dietetic causes. For some time they have been housed in warm stables, and possibly clothed. It is a great change to the varying temperature of even our summer weather. There is not the same danger if summered in a box, although the diet be green food.

Roaring is found associated with disease of the nervous system, whether due to climatic or dietetic causes. Many of you will remember the cases in Messrs. Leathers' practice, caused by eating "mutters," and in which the laryngeal paralysis was fatal, if the operation of tracheotomy was not performed early in the attack.

TREATMENT.—The treatment (if any be adopted) of Roaring will depend entirely on the cause.

Where it is due to deposition pressing on the nerve, if this be absorbed, and the nerve resumes its functions, the Roaring will cease. Thickening of mucous membrane may also become absorbed.

Those of us who have examinations as to soundness of hunters and race-horses will readily call to mind cases of "wind" which are sound one day, and on another day they make a slight noise, ultimately, in my experience, terminating in chronic Roaring. If treatment of any kind is to be tried in progressive muscular atrophy, these are the cases in its earlier stages.

Nervous affections of similar character in the human subjects are some of them, by means of long, tedious, and persevering treatment, cured or relieved; but it will rarely be found satisfactory in our cases.

Fleming recommended electricity in the shape of Faradisation, and potassium internally, and quotes two successful cases. He has also tried with "Ormonde." I asked him the question: "Has the treatment of 'Ormonde's' case been successful?" and received the following reply: "Not entirely, but it enabled him to win his two races at Ascot in 1887. He might have gone on running, but the Duke of Westminster feared he might be beaten, and this would have spoiled his victorious record." It is all summed up in one word—unsatisfactory. Treatment of hereditary muscular atrophy is useless; it is to me like building a tower crooked, and then trying to straighten it. Clearly and unmistakably hereditary, no animal unsound in wind should be used for stud purposes. Let this fact become engraven on the minds of horse-breeders, and in that will be found the rational and only satisfactory treatment of Roaring.

CONCLUSION.—Roaring or Laryngismus paralyticus is due to progressive muscular atrophy of neurotic origin.

It affects big horses.

It is hereditary.

The best advice is not to breed from diseased stock.

It may come on gradually, without any specially exciting cause; but it oftener follows diseases of the respiratory organs, due to climatic conditions or changes, especially if animals are in a plethoric state.

Once established, climate does not affect it.

TRACHEOTOMY IN CONFIRMED ROARING.—Mr. Jones, V.S., of Leicester, exhibited his patent tracheotomy tube, and described several cases; also his method of performing the operation.

RUPTURE OF THE RECTUM, AND PROTRUSION OF THE UTERUS AND URINARY BLADDER THROUGH THE ANUS, IN A NON-PREGNANT SOW.

BY HENRY GRAY, M.R.C.V.S., CALVERTON, NOTTS.

On Sunday, January 22nd, 1888, I was called to attend a young sow, aged thirteen months; reported, "having put down her seat." On my arrival I found the animal lying stretched out on her left side, straining and grunting—in fact, in the same manner as though she were "pigging." Protruding from the anus was a red and inflamed mass of viscera, which reached as far down as to the hocks, when standing. At first sight, I mistook the protruded organs for a portion of the small intestine. On examining it, I found it to be the uterus and urinary bladder, as far as the meatus urinarius.

The urinary bladder was filled with urine, which I evacuated, by puncturing the organ near the cervix vesici, with a pair of fine-pointed scissors. After passing the points of the scissors into the bladder, I slightly opened the blades, to prevent the opening closing and to allow the urine to escape. I then tied a rope over each hock and suspended the animal to a beam. On examining the rectum I found a small rent on its floor, within an inch of the anus. As the wound was too small to allow the swollen organs to be returned into their natural cavity, I resolved to amputate the uterus. I cut through the broad ligaments with a pair of scissors, and then tied a fine ligature around the neck of the womb within an inch of the meatus urinarius, and excised the organ with a sharp knife.

After washing the remaining portion of escaped viscera with tepid water and dressing it with carbolized oil 1·30, I returned the urinary bladder, etc., into the pelvic cavity, by pressing gently on the floor of the vagina with my right hand, and pushing the bladder through the rent in the rectum with my left hand. The animal was let down, and she walked to her sty and vomited.

The animal partook of food, etc., and seemed on a fair way towards recovery, when the owner being impatient, had her killed on the fourth day. I did not make a *post-mortem*. I ascribe the cause of this—to me, a rare case—to the straining caused by constipation.

I may also mention that I treated the same animal for Prolapsus of the rectum on January 14th, 1887, occurring fourteen days after the weaning of her litter. About two feet of the rectum had protruded and was ulcerated. It was returned and held in its position, by passing three interrupted sutures of tape through the anus. There was no recurrence of the Prolapsus. The animal

had been fed sparingly and improperly. She was weak and emaciated, but quickly improved in condition on being fed better.

Prolapsus of the anus and the rectum is of common occurrence amongst swine. It attacks animals of all ages and in all conditions, but principally ill-fed animals.

SCARLATINA IN HORSES.

BY E. A. W. HALL, M.B., C.M. ED., 2ND BENGAL CAVALRY; AND R. W. BURKE, A.V.D., SAUGOR, CENTRAL PROVINCES, INDIA.

SCARLET FEVER in horses is believed to be a comparatively rare disease, except as a sequel to some other debilitating disorder. It has been witnessed as a more or less prevalent disease of horses in the Second Bengal Cavalry, stationed at Saugor. We may, therefore, describe a few typical cases only, to show the leading characteristics.

The first case we shall describe is that of an officer's charger. She started with slight nasal catarrh and a cough, with weakness and distaste for food; a week after she showed œdema of the legs, commencing at the fetlocks and proceeding upwards; on the third day of the œdema there were small petechial extravasations in the mucous membrane of the nose, and an icteric tinge of the conjunctivæ: the temperature that evening, the 20th January, was 105° F.

21st, morning.—Temp. 104°; the extravasations had united and run into each other in several places, and the swelling of the legs had become worse: evening, state the same.

22nd, morning.—Temp. 102°. Evening, temp. 103°. Mucous membranes of a bright-red colour; cough and catarrh still marked, but no sore-throat.

23rd, morning.—Temp. 101°. Evening, temp. 102°. Condition of animal remained the same till the 26th, after which the temperature became normal and did not go up again.

The rest of the history is one of slow and gradual improvement. The legs remained swollen for a long time; the swellings lessened towards evening, but in the mornings was always worse.

Nand Lall's horse.—After the catarrh and cough had been present for a few days, an eruption, which the *salootrie* characterised as "Urticaria," broke out over the whole body. After three days this eruption disappeared, but petechial spots on the mucous membranes and œdema of the legs appeared, as in the case above described. The highest temperature recorded was 104°, remaining for twenty-four hours.

Pony.—The whole of the face was found to be very much swollen. Petechiæ appeared, on the conjunctivæ especially, the

latter becoming much inflamed and dark in colour; and, finally, the eyes and eyelids swelling from inflammation, the eyes were closed; there was inflammation of the cornea and hæmorrhage from one eye, which sloughed, the whole eye coming away, leaving a hollow; the other eye partially recovered. Petechiæ also appeared on the mucous membrane of the nose, with catarrh. There was patchy extravasation of the buccal mucous membrane, and sloughing of mucous membrane of the whole of the mouth, with difficulty in feeding. The animal became gradually weaker and weaker in spite of all nourishment and treatment prescribed, and was given away to a *fakir;* it died shortly afterwards.

The above case is interesting in association with corneal ulceration, noticed in Scarlatina of the human subject.

The regiment left Saugor on Feb. 7th, and marched fifteen miles. On the 8th marched fifteen miles into Rarawan, where it encamped. The same evening a horse showed some swelling of the hind fetlocks, and received fomentations and walking exercise, which reduced the swelling. On the 9th the swelling had subsided; 10th, œdema increased; 11th, came into Saugor, thirty miles; when it arrived the swelling had almost disappeared; 12th, enormous swelling of all four legs, extending to the body; epistaxis of watery blood; temperature, 102°: Evening, epistaxis stopped, after continuing the whole day. Petechiæ now observed in irregular patches on Schneiderian mucous membranes; small eruptions on the swollen limbs. 15th, there was no catarrh and no cough, and the temperature also was normal; but the eruptions on the legs had coalesced, forming large irregular patches of swollen skin, from which sloughs had resulted in different places.

The foregoing cases are all of them typical, and afford between them excellent illustrations of most of the more diagnostic characters of Scarlet Fever in man. But though, as we have in the above cases shown, the similarity between human and equine Scarlatina will be admitted by many practitioners, we must not be unmindful that experience has clearly shown us that Scarlet Fever in the horse is not generally so severe as the same affection seen in man, and more frequently assumes the benignant form than it does in the latter patient. The lesions of Scarlatina are, as a rule, various; but, on the other hand, individual peculiarities seem, in our opinion, sufficiently to account for this, as witness the occurrence of "tubercular" Phthisis in one member of a family, and "fibroid" Phthisis in another. The difference between man and the lower animals imparts to the tissues the alterations in their molecular disposition to the disease.

ABNORMAL RETENTION OF THE FŒTUS.

BY J. MCGAVIN, M.R.C.V.S., MONTGOMERY.

ABOUT this time last year I was called to a farm where there is a herd of pure-bred Hereford cattle, one of which could not calve. On inquiry I found she had been fed in the same manner as all the herd, viz., on hay, straw, and a few swede turnips, and was in fair stock condition. She had gone between four and five weeks beyond her normal time; her udder was very small; and the cowman informed me she had been about twenty-four hours in labour.

On examination, I found the vagina had not relaxed, nor the os uteri dilated; so that it admitted my hand with difficulty. The membranes were intact, and at times she was straining very hard. I waited for several hours, and, as labour did not progress, I thought it advisable to leave her until morning.

On arriving next morning at nine o'clock, I found the membranes had just ruptured, and she was straining very hard. The vagina was much in the same condition, and the os uteri was about an inch larger than when I examined her the previous night.

The presentation was natural, and I found the calf was very large. I decided to perform embryotomy—very difficult under those circumstances. However, after removing both fore legs, and attaching a rope round the neck of the calf, with the assistance of ten men, I could only get out the neck; so I had to remove the contents of the thorax and abdomen, which were all very large, and after very severe pulling we extracted the calf, but the cow died.

Three weeks afterwards, another cow was in the same condition, and we performed the same operation with the like result.

I have since heard that three more cows were affected in the same way, and died undelivered; and the gentleman who so informs me states that he has had four cows this year in a similar condition. Some of the calves were alive up to the commencement of labour, and others had not been long dead. There was no decomposition; all the calves were very large, and the water-bags very small. Two of the cows were primiparæ; the others had all one, and some two calves before.

I have never had any similar cases before, and I have consulted two veterinary surgeons on the subject without receiving any information, as they also have never had any experience of such cases.

I have also consulted Fleming's "Obstetrics," but there is no suggested cause there that I can ascribe for it.

I should be glad if some of the readers of the Journal would inform me if they have met with similar cases, and how they

treated them, what they assign as the cause of the condition, and how it could be prevented.

I am aware that chloral and chloroform are given in those cases, but I did not adopt that treatment.

EPILEPSY FROM PROPAGATED IRRITATION.

BY T. ASSHETON-SMITH, M.R.C.V.S., CALCUTTA.

THE following case of Epilepsy from propagated irritation may prove interesting to the readers of the VETERINARY JOURNAL :—

The patient was a bay Australian gelding, aged eight years. He had been subject to the fits for some eighteen months, but at first they were mild, and the intervals between them prolonged ; so the animal was kept at work, and on one occasion was attacked while in harness. He came to a standstill, and staggered a good deal, but did not fall.

Subsequently the seizures increased in severity, until all the distressing symptoms of the disease were developed, and he scarcely recovered from one fit before another supervened. Under these circumstances I had him destroyed.

On examining the body, in the double colon, below the sigmoid flexure, I found a large enchondromatous tumour, roughly kidney-shaped, and attached at the hilum to a point on the mucous lining of the bowel, which had become elongated and twisted to form a peduncle. The tumour, which weighed more than ten pounds, had thus considerable freedom, and must have been a source of great irritation to the system.

On making a section of the tumour, I found that the central portion had undergone metamorphosis into true bone, resembling cancellated bone tissue ; a space existed between the bony core and the cartilaginous shell, which was occupied by greenish purulent matter with a very offensive odour—no doubt a product of some degenerative process, and I believe the epileptic symptoms were largely due to the escape of this material through perforations in the cartilaginous outer covering into the bowel, and absorption into the blood.

Some medical practitioners in this city, to whom I showed the specimen, concluded that the growth was congenital ; but I cannot reconcile this opinion with the late appearance of the symptoms.

Strange to say, during life the animal exhibited no sign of bowel trouble.

Editorial.

THE ANTI-VIVISECTIONISTS AND PROTECTIVE INOCULATION.

From questions and answers put and given in the House of Lords, and the report of latest proceedings at the Monthly Council Meeting of the Royal Agricultural Society, it is evident that a grave error has been committed in introducing into this country protective inoculation for the serious disease known as "Black Quarter." The utility of this measure had been amply confirmed in France by its introducers, Arloing and Cornevin, and in other countries by eminent veterinarians, long before it was thought of in England. Therefore there was no occasion to resort to what is termed "experimentation" here, in order to ascertain what might occur from inoculation with virus prepared according to the method devised by its authors; the results of this inoculation were already well known. But when the Royal Agricultural Society determined to try to protect cattle from Black Quarter in this way, experiments were decided upon, and a great fuss made over the matter, as if a new and most important physiological or pathological investigation, necessitating experiments on animals, was about to be carried out. In this lay the mistake; for in order to have the "experiments" conducted in a legal manner, the Royal Veterinary College had to be licensed by the Home Secretary as a place in which to perform them, and its Principal as the experimentalist. Not only did the application for these licenses require much time and occasion a good deal of trouble, but it attracted the attention of the anti-vivisectionists, who are always on the outlook for cruel men of science. The consequence has been that much embarrassment, delay, and annoyance arose; the late Professor Robertson's assistant in the so-called "experiments," has narrowly escaped a criminal prosecution, because he was not a licensed person; and deputations to the Home Secretary, official correspondence, and suspension of a most beneficial operation, have been reported.

Now there cannot be a doubt that there was no occasion whatever for either experimentation, in the proper sense of the term, nor for licensing either place or operator. The Privy Council has bungled over the business quite as much, if not more, than the Royal Agricultural Society. Inoculating an animal to prevent it being attacked by disease is no more experimentation than giving it a dose of medicine to ward off the same disease, or to cure the creature when it is ill. Vaccinating children to prevent their having Small-pox is not experimentation, nor do the vaccinators require licenses from the Home Office.

For very many years cattle have been inoculated in this country to protect them against contagious Pleuro-pneumonia, and licenses to enable veterinary surgeons to inoculate them have never been thought of.

The Privy Council and the Royal Agricultural Society have simply

created an obstacle for themselves, and left the Home Office and the anti-vivisectionists to make the most of it as an aggressive weapon to demolish preventive medicine. We do not require to appeal to the Home Secretary for permission to try or adopt new medicinal remedies for the cure of disease. Inoculation for the prevention of Black Quarter, Swine-plague, or any other disease, is altogether beyond the scope and interference of the Home Office and anti-vivisection societies; and if the operation is stopped, or the operators annoyed or restricted in any way, it is their own fault, or that of those who should see to it that animals receive the full benefit of scientific protection from scourges which cause them great misery and suffering, and the public much loss.

The Vivisection Act was originally intended to guard against the infliction of cruelty on animals by needless experimentation, or through experiments performed by men who had no definite object in view, or were incompetent to procure beneficial results from their attempts. It must not be allowed to prevent the adoption of measures—protective or remedial—which have for their object the prevention or cure of disease. Inoculation as a test for Glanders or Rabies is not an experiment, and its adoption may in many instances save many lives, not only of animals, but of human beings. Veterinary surgeons and medical men have been labouring under an incubus, without the slightest excuse. Licenses from the Home Office are not needed for them to practice their humane and beneficent profession, and inoculation—whether as a test of the presence of disease or as a protection against it—is certainly a part of their professional duty.

Had the Royal Agricultural Society and the Privy Council been aware of this, and acted accordingly, they would have been spared much trouble and delay. It is not yet too late to cut the Gordian knot, which they themselves have tied, by going on with the inoculations without reference to the Home Office, or heeding the anti-vivisectionists, who care not how much suffering and loss may be caused by animal diseases, so long as they are allowed to ride their hobby at their own pace and to their own fancy. They have been a great deal too much considered in this country, and in this instance, through some strange aberration of ordinary intelligence, they have had it all their own way. Surely it is time to exercise common sense!

THE POTATO AND THE DIAGNOSIS OF GLANDERS.

BY PROFESSOR ALPH. DEGIVE, BRUSSELS VETERINARY SCHOOL.

WHAT can be more strange, at first sight, than the association of these two things—Glanders and the potato? It might be considered one of those strange combinations of words and ideas sometimes used by the author of *Feuilles d'Automne.*

What connection, in fact, can there be between the potato and Glanders? This affinity is not difficult to be found by those who are familiar with the study of the infinitely little.

These know that the potato is not only enjoyed by the *macrobes* of various species, but that it is also a dainty morsel for a great number of *microbes.*

Among the latter may be mentioned the specific micro-germ observed by MM. Bouchard, Löffler, and Schütz in the Glander-Farcy lesions.

This micro-germ has not only been verified in the lesions themselves, but it has been isolated by culture, and inoculation with the cultivated microbe has reproduced the malady with all its typical characteristics.

The sympathy which exists between the microbe of Glanders and the potato has just received a very useful application in the diagnosis of the Glander-Farcy affection. The fact has been communicated in the following terms to the Société Centrale de Médecine Vétérinaire, December 30th, 1887, by M. Nocard, Directeur de l'Ecole d'Alfort:—

The best means of cultivation of the bacillus of Glanders is undoubtedly the potato. In fact, it is known that many microbes have the singular property of germinating on its surface, and forming colonies of various colours, each species maintaining its own tint.

The Glander bacillus multiplies very rapidly on its surface, producing a sort of thick, moist, viscous layer, reflecting after some days—as may be seen by numerous specimens—a tawny colour, which gradually becomes darker until it is of a bright chocolate tint.

Of all the known microbes, the Glander bacillus alone assumes this appearance; it is absolutely characteristic, and is sufficient by itself to prove that the product sown was glanderous.

This proceeding is doubly precious, because it allows the glanderous colonies to be distinguished in the midst of a great many others of different kinds, and especially because it is within the reach of all.

This is the best way to proceed to grow these colonies. Begin by cleaning the potato without injuring the skin, then plunge it in a solution of corrosive sublimate (1 to 1,000) for one or two hours, in order to destroy the germs which exist on its surface. Then, after dividing it, place each portion in a glass receiver furnished with a lid, or, if this cannot be had, in a bowl covered with a plate, which must be submitted to the vapour of boiling water for one or two hours, so as to cook the potato and destroy all the germs which may still pollute it.

This done, the lid must be raised obliquely, to prevent the germs from the air falling upon the potato; then the Glander product, which must be carefully diluted with a large quantity of distilled or sterilized water, must be spread over the surface by means of a small pipette.

After a few days a great number of colonies of different appearances will be developed, among which those of a tawny brown are characteristic of the Glander bacillus.

I have quite recently had an opportunity of applying these principles to the condition of a man suspected of Farcy, about whom M. le Dr. Bucquoy wished to consult M. Leblanc and myself. MM. Bucquoy and Leblanc were clinically convinced of the existence of Farcy, but M. Bucquoy wished to have positive proof.

I beg to be allowed briefly to relate the result of the experiments which I made for this purpose; they carry their own teaching.

FIRST SERIES.

A. *Experiments.—October 13th.*—Several centimetre cubes of pus were collected in sterilized tubes.

October 15th.—This pus served for the inoculation of—

1st. Two dogs, by scarification on the forehead.

2nd. A guinea-pig and a rabbit by hypodermic injection.

3rd. A guinea-pig by intra-peritoneal injection.

October 18th.—The same matter was diluted and sown with the accustomed precautions on the surface of three potatoes prepared *secundum artem.*

B. *Results.*—First, *Dogs.*—The inoculated surface did not at any time present the least trace of ulceration. The scarifications healed rapidly. The skin remained supple, and was not discoloured. Negative result.

Second, *Guinea-pigs and rabbits.*—Nothing abnormal was observed until October 26th, when the inoculated guinea-pig, which had been inoculated beneath the skin of the thigh, had the crural glands tumefied and indurated; in fine, nothing characteristic.

November 5th.—The guinea-pig inoculated beneath the peritoneum was found dead. It was very emaciated; voluminous abscesses were developed in the sub-lumbar glands; spleen ten times its natural volume, and studded with miliary tubercles; the lungs showed a small number of cheesy tubercles.

November 9th.—The guinea-pig inoculated beneath the skin died, offering identical lesions. At this date the rabbit had only induration and central suppuration of the crural glands.

Third, *Potatoes.*—On October 21st, on one of the pieces of potato there were four round prominent colonies, of a faint tawny colour, and which gradually became darker, until on the 23rd they assumed the appearance characteristic of the Glander bacillus. Microscopic examination and further cultivation of them on gelatine and jelly left no doubt on the subject.

To sum up: In this first series the cultivation of the germs on the potato gave the earliest confirmation (in five days) of the diagnosis of Glanders.

SECOND SERIES.

A. *Experiments.—October 27th.*—Pus was again taken from the same invalid.

October 29th.—The pus was employed to inoculate—

1st. An ass and a dog, both vigorous, by scarification on the forehead;

2nd. Two adult guinea-pigs, by scarification on the croup;

3rd. Two potatoes.

B. *Results.*—First, the ass. She remained lively until November 1st; ate with good appetite; normal temperature 38·4° Cent.

November 2nd.—Temperature 40·2°; appetite diminished.

November 3rd.—Same condition. Until this date the scarifications do not appear to have been the seat of any pathological change; only a slight sensibility observed when pressed upon.

November 4th.—A slight red serosity issued from the scarifications on pressure; appetite gone; extreme weakness.

Death occurred during the night of the 5th-6th November.

Post-mortem.—Inspection at one o'clock on the 6th. Formidable lesions of acute Glanders in the two lobes of the lungs, the spleen, and the bronchial glands; a considerable number of Glander bacilli were found in them, and they were also discovered everywhere in the marrow of the bones.

Second, the Dog.—*November 3rd.* A slight oozing was observed at two points of the scarified surface.

November 4th.—Small wounds and appearance of ulcer.

November 5th.—Condition stationary.

November 7th.—The ulcers had completely disappeared.

To sum up: Nothing demonstrative.

Third, *Guinea-pigs.*—Nothing noteworthy, except a little thickening and sensitiveness at the points of inoculation and a little swelling of the crural glands.

Fourth, *Potatoes.*—So early as November 1st they exhibited numerous colonies characteristic of Glander bacilli.

These experiments show:—

1st. The great superiority of the ass as an agent to prove the existence of Glanders.

2nd. The great service which may be derived from the cultivation of Glander matter on the potato, in order to confirm the diagnosis in doubtful cases of this disease.

The experiments also seem to prove that the Glander virus becomes somewhat attenuated in its passage through the human organism (or at least it was so in the case of this man), since in three attempts on the dog—a most valuable agent for testing the existence of equine Glanders—it was almost completely refractory to inoculation.

The above does not contain the whole of the communication made by M. Nocard to the meeting of December 24th. The first part, besides describing the characters of the test inoculations for Glanders upon the ass, the dog, the guinea-pig, and the rabbit, gave indications for the best method of procedure for microscopic examinations, and for obtaining the pure cultivation of the Glander bacillus.

Test Inoculation.—What I have already said on various occasions on this subject enables me to dispense with further discussion. I will only observe that M. Nocard speaks of test inoculations, without making a single reference or quotation, as if no one before himself had studied the subject. It would not have been waste of time for him to have given due credit to the labours of, among others, MM. Reul, Cadéac, and Malet, in indicating, simplifying, and popularising these valuable operations.

I will add that I consider the proposition formulated by the director of the Alfort School, concerning the vulnerability of the ass to the action of the Glander virus, far too absolute. "The ass," says he, "is so favourable a medium for the development of the action of Glander virus, that in it the malady soon assumes a very acute form, and causes death in an interval of from *five to twenty days at most;* and that *if this animal resists a good inoculation the non-existence of Glanders may be safely inferred.*"

On this subject I will relate the observation made in the clinic of Cureghem in 1879, on an ass inoculated, by means of a seton, by scarification, and by intra-peritoneal injection, with different matters taken from a horse suspected of being affected with Glanders.

It was not until a month after the first inoculation, and about three weeks after the last, that there appeared a phlegmonous Adenitis, which was incompletely cured, leaving a slightly indurated swelling.

Then only *a month-and-a-half later*—that is more than two months after the intra-peritoneal injection of the suspected matters—unequivocal symptoms of *acute Glanders* were developed, which killed the animal in a few days. At the autopsy, pulmonary neoplasic lesions, of more or less duration, were found; these were composed of a homogeneous, greyish-white tissue imbedded in the pulmonary tissue, which was but little altered.

Cases of this kind, I admit, happen exceedingly rarely. But however rare, the exception is possible, and it suffices to prove that if an ass resists a well-made inoculation twenty days, we are not at liberty to conclude as to the non-existence of Glanders. The result would afford a *strong presumption* that this is the case, but it is not completely certain. Two or three negative inoculations like that described by M. Nocard would be necessary for this purpose.

M. Nocard inoculated the dog by scarifications on the forehead. He preferred to employ hypodermic inoculation on the guinea-pig. By the aid of a Pravaz syringe, he injected under the skin a small quantity of suspected liquid, diluted with distilled water.

M. Nocard says, if the guinea-pig is sacrificed in twenty-five or thirty days after inoculation, there will be found always a vast number of small white points in the spleen, often also in the liver and lungs; these are nothing else than miliary tubercles of a glanderous nature.

I acknowledge that with the guinea-pig the injection under the skin succeeds more frequently than the dermic inoculation by scarification; but, nevertheless, I consider this last ought to be chosen rather than that adopted by M. Nocard.

It is very rare that the deposit of Glander matter in superficial cutaneous incisions does not cause the development of the characteristic ulcerous lesions after eight or ten days, that is to say, in three times as short a period as by the hypodermic operation.

Microscopical Examination.—"The microbe of Glanders," M. Nocard calls to mind, "is a rather larger bacillus than that of Tuberculosis, a bacillus which is readily stained by aniline. In order to colour it, instead of using distilled water as a solvent, it is necessary to use an alkaline solution (ammonia 1 to 200, or potash 1 to 10,000), which facilitates the impregnation of the microbe by the colouring matter. Again, it is necessary that the microbe be young, for if it proceeds from a culture lasting some days it only colours in points, which might cause us to believe in a series of micrococci, if higher magnifying did not show its continuity. The following is the best way of proceeding to obtain a good preparation of the bacilli of Glanders. Spread on a plate a thin layer of virulent matter; let it dry; then pass it rapidly through the flame of a spirit lamp. After this, place the plate for five minutes on the surface of the colouring liquid, composed as follows: Solution of potash (1 to 10,000) 3 per cent., and alcoholic solution of methylene blue 1 per cent. Then wash the plate in a solution of phenic acid 1 to 200; afterwards wash in distilled water, and dry it; then mount it in balsam.

"If it is now examined in the microscope and magnified 800 to 1,000 diameters, there are seen a great number of more or less long, very granular bacilli, with rounded extremities.

"This only applies to the discharge or the pus derived from a case of Acute Glanders running a rapid course, *for the lesions of chronic Glanders rarely contain visible bacilli.* This rarity of microbes in old lesions is probably because the bacillus of Glanders very soon loses its bacillar form, and resolves itself into granules or spores, which are very difficult to be distinguished from the numerous proteic granules existing in tuberculous tissue."

Cultivation.—The great difficulty of cultivation consists in the impurity of the Glander products; discharge or pus contain, in fact, a variable number of different germs at the same time as the bacillus. The best means of easily obtaining a pure cultivation is to produce Acute Glanders in an ass, or better, in guinea-pigs. The sowing is then accomplished by spreading on the surface of a nutritive solid medium—gelatine or jelly, for example—fragments of spleen, in which myriads of bacilli usually swarm. It is always necessary to sow several tubes at the same time.

"After a few days, the seed has multiplied in the form of a white and semi-transparent thin layer, reflecting a slightly bluish tint. This gradually becomes thicker, and soon quite opaque. The tubes of jelly may be laid on a stove, at a temperature of from 35° to 38°, and the cultivation then takes place much more rapidly in twenty-four, or at most forty-eight hours."

PROTECTIVE INOCULATION FOR STRANGLES.

So long ago as 1823, we find that Toggia, of Turin, in a booklet entitled "Sul Cimurro e sull' Utilità dell' inuesto di questa Malattia" (on Strangles, and the Utility of Inoculation for that Disease), published in 1826, in recognising the contagiousness of the disorder, also discovered that it could be inoculated, and that such inoculation was protective against natural infection. He states that, when veterinary surgeon to a stud of horses in 1823, he in-

oculated eight healthy colts with matter derived from a horse in the second stage of Strangles; and, afterwards, six other colts with the nasal discharge taken from the first.

Four days subsequently, there was observable in some of them a slight cough, followed, firstly, about the seventh day by a slight discharge of mucopus, which, however, flowed more abundantly when the animal coughed; secondly, by inflammation of the submaxillary lymphatic glands on the same or the eighth day; and, lastly, spontaneous opening of the abscesses in these glands about the fourteenth day.

He considered that the symptoms observed, however mild they appeared to be, were sufficient to prove that by this inoculation he had communicated the disease to the colts; and upon this fact he founded the conclusion that Strangles is a contagious affection, *sui generis*, and capable, therefore, of transmitting itself the same as by inoculation. The malady which he thus communicated, he asserted to always manifest itself in a mild and benign form. Since these first experiments, and during two-and-a-half years, he inoculated in the same manner twenty-four colts. The result of these additional experiments still more confirmed him in the belief that such inoculation is proper to protect young horses from what he called "spontaneous Strangles," as none of those which had undergone the operation had developed the disease naturally.

Having been transferred to another stud, Toggia much regretted that his new duties not only prevented him from continuing his experiments, but also from submitting colts already inoculated to the counter-test of re-inoculation, in order to assure himself that they had really acquired by it immunity from accidental infection.

In conclusion, he drew the attention of veterinary surgeons to the results he had obtained, and which, if they were verified by greater experience, would lead to Strangles being considered as analogous, in many respects, to human Small-pox, and to Scabies in sheep (the sarcoptes ovis had not then been discovered).

It may be noted here that Solleysel, in the seventeenth century, compared Strangles to Small-pox.

THE HISTOLOGY OF THE SKIN OF THE HORSE.*

BY FRED SMITH, M.R.C.V.S., PROFESSOR, ARMY VETERINARY SCHOOL, ALDERSHOT.

So far as I am aware, the minute anatomy of the skin of the horse has never before been described. On some points the information I have given is by no means so complete as I should have liked, but it is hoped that the article may help to fill a void in veterinary literature.

It need hardly be said that the skin of the horse, generally speaking, differs in no essential respect from that of man; there are, however, some individual peculiarities to which we must devote especial attention, whilst those points which are the same in both animals will receive but little notice. Skin will differ in quality in different horses. In the race-horse, for instance, we have a skin particularly thin and delicate, the hairs which grow on it are very short and fine, and even the long hairs of the mane and tail are scanty and short. As we pass through the different degrees of breeding until we arrive at the cart-horse, we observe that the skin gets much thicker, coarser in texture, the hairs very much more abundant, coarser, longer, and even growing in profusion in parts which on the thoroughbred horse are barely

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covered by hair. The production of an abundance of hair, particularly if curly, and a thick skin are signs of underbreeding.

It would appear almost superfluous to say that the horse changes his coat twice a year—viz., at spring and autumn; in the former case he loses a warm for a fine short coat, and in the latter he gets rid of his fine coat for a long and often shaggy one. This changing of the hair is a point of considerable interest, and one to which especial attention has been directed in our histological inquiry. Apart from its scientific usefulness, a knowledge of skin function as learned by the microscope has its practical bearing. Horse-owners know that at the season of moulting horses are not so fit as they should be, and one of the most common excuses made for horses looking poor in spring and autumn is that they are changing their coats.

One of the indications of a healthy animal is the feel and appearance of his skin. It should be supple, smooth, glossy, and move freely over the subcutaneous tissues. One of the earliest signs of ill-health is often afforded by the skin; the horse, as it is termed, "looks wrong in his coat"; it is either "staring," or else, instead of moving freely over the ribs, it feels as if glued down to them (hide-bound).

The skin differs in appearance, depending upon its position. Around the lips it is closely attached to the muscular structure below, and the whole feels one compact mass; we also notice that the hairs are here few and fine, but that we have also growing out from the skin long and very fine hairs, commonly known as feelers or whiskers. Behind the angle of the mouth the skin is exceedingly thin and supple, and is nearly the thinnest in the body; over the head and cheeks it is thin and never has fat beneath that part covering the external masseter muscle. On the sides of the neck the skin is still thin, but at the crest where the mane is growing it becomes much thicker, and is subcutaneously much confused with the fatty mane; down the front of the chest and inside of the forearm the skin is particularly thin and very lax; over the scapular region it becomes thicker and more firmly attached below, and over the back and loins we have the thickest skin found; it is also thick down the quarters, but inside the thigh and up to the groin is the thinnest skin covering the body; the skin over the limbs is of medium thickness. If the hair be removed from a horse's body it will be found that the colour of the integument approaches that of the negro; the epidermis is black or bluish-black, excepting in those places where there are white hairs, and here the integument is pink; the colour of the skin in what are usually called grey horses is black or bluish-black.

From what has been said we may conjecture that though the skin of the horse is divided as in man into dermis and epidermis, and contains glands, vessels, nerves, etc., yet these parts will present different appearances depending upon their position in the animal body.

The *corium* consists of a dense network of fibrous tissue, the fibres forming meshes; the latter at the upper portion of the skin are small, the fibres running generally parallel or interlacing so as to form a fine network; as we get deeper into the skin the network increases in size, the bundles of fibres are much larger, and it is evident that they are running in two directions, for some may be seen in section represented as spaces, whilst others may readily be traced up and down, or from side to side. Where the skin is thickest this network of fibrous tissue, amongst which can be detected connective-tissue corpuscles, is sure to be the best developed.

The upper surface of the corium is irregular in outline, forming the papillæ of the skin; the size of these papillæ will vary with the part examined. On the lips they are large, and towards the mouth they become very long indeed, increasing in length until the mucous membrane is reached, where they are succeeded by the very long papillæ which grow from this part (see fig. 1). It

is only at the margin of the lips where this extreme papillated condition is observed, for although the whole skin of the lips has a well-developed papillated surface, yet nowhere is it so well observed as here; the papillæ are from ·005 to ·014 of an inch in length, and their width at the base is from ·001 to ·007 of an inch; inside the mouth the papillæ are much longer, and measurement gives them at ·04 inch, and a breadth of ·005 to ·007 inch. The papillæ or finger-like processes are highly endowed with nerve supply, and they correspond with the long finger-like papillæ I have found on the touch extremity of the elephant's trunk. The whole of this papillated surface is covered by a thick and beautifully arranged epithelial layer to be described later on (fig. 4).

Passing somewhat deeper into the corium of the lips we are much struck by the very large amount of voluntary muscular tissue entering into its formation; muscular fibres can be traced running up between the hairs for a considerable distance; below and around the hair-bulbs they are exceedingly numerous, and in parts where the section has been made transversely to the course of the fibres, large planes of voluntary muscle are to be seen, presenting in stained sections the most beautiful appearance.

In reality the part beneath the skin of the lips is wholly muscular, broken here and there by hair-bulbs, connective tissue, and glands. In the skin of the wing of the nostril we also observe a large amount of muscular tissue entering into the formation of the corium, with fibres running up between the hairs. The papillary layer of the corium of the nostril is very regular; there are no long papillæ such as are found on the lips.

The corium of the general surface of the body is made up of the usual fibrous fasciculi. There are no fibres of the voluntary order of muscle, and the papillary layer is small and fairly regular; sometimes the papillæ are single, at others compound. The corium of the skin under the tail is delicate, the papillary layer barely exists; there are but few elevations or depressions on the surface; the usual fibrous reticulum of the corium exists and is well marked. In the mane we have a well-developed corium, and the papillæ here are large, and the majority, instead of being pointed, are square-topped, almost flat on their surface. In the skin of the leg the papillæ are well marked.

The papillæ of the skin are vascular and nervous, but there is no regularity in their arrangement; we do not find the nervous and vascular papillæ alternately placed, as I am informed occurs in some skins.

Epidermis.—The surface of the corium is covered by the epidermis, which can be divided into the usual two layers. The Malpighian rete is well marked throughout, though it requires some manipulation to bring it into view; the cells are columnar and nucleated; they contain a quantity of pigment which in some parts is so considerable as to completely obscure the cells. This is very noticeable in the skin of the lips and surface of the tail; in the mane we find that this pigmented condition of the Malpighian layer is very much reduced in amount, and is sometimes absent.

The usual arrangement of epithelium occurs, becoming in the stratum mucosum progressively flatter as we reach the surface of the skin. In some parts this is beautifully marked, as on the lips, particularly the inside, where every slight change in shape can be followed with wonderful regularity, from the deep cubical cell to the superficial flat cell (fig. 2). Nuclei can be distinctly seen in the epithelial cells, particularly well marked in that layer just described. Usually we find a certain amount of brown pigment in the cells just above the rete Malpighii, but sometimes the whole thickness of the epidermis is thus coloured, notably in the wing of the nostril and the skin under the tail. In one or two parts of the body the nuclei of the epidermal cells are very large and well developed, so much so that in looking at a

section which is not very thin we cannot see the margin of the ordinary epidermal cells, but we see innumerable nuclei extending for some distance towards the surface of the skin, filling the spaces where the hairs emerge from, and looking more like small round or oval cartilage cells; nothing more in many cases can be seen but clusters of these bodies. This appearance is especially well marked in the skin of the mane and tail.

The direction taken by the epidermal cells corresponds to the elevations of the papillæ; on the lips the elevations and depressions are extreme, and give the layer a wavy appearance; we observe that bands of pigment are common, running from the deep towards the upper layer of the skin; these bands correspond to the depressions between the papillæ of the corium (fig. 1); in other places, such as the tail and mane, the epithelium is fairly straight, whilst on the general surface of the body it is wavy.

The thickness of the epidermis on the muzzle is from ·03 to ·045 of an inch, inside the mouth ·05 inch, on the wing of the nostril ·022 inch, on the general surface of the body ·003 to ·005 inch, and on the mane ·014 of an inch.

Blood-vessels.—By means of transparent injections we have been able to study very satisfactorily the blood-vessels of the corium. The arteries run up towards the surface, giving off large branches in their course to the structures they pass near, such as hair-bulbs, sweat and sudoriferous glands; large vessels completely encircle the hair-sac, and can be seen surrounding and passing into the sebaceous glands; the main trunks continue their upward course, and are distributed to the papillæ, in the larger of which as many as three or four trunks enter and penetrate up to the Malpighian layer (see fig. 3).

Nerves.—The nervous supply, particularly to those tactile organs the lips, has received especial attention. Lying in the deep portions of the skin we have large branches of nucleated nerves, seen either running in bundles, or, if viewed in section, as circular groups of bodies consisting of nucleated cells enclosed within a firm sheath. Three or four of these groups may often be seen side by side, but they may also be seen singly; running up through the skin they give off large branches to the hair-sacs, and in the external follicular sheath of those large hairs on the muzzle, termed feelers, the nerves form a large plexus. Excepting the tactile papillæ, there is no part of the skin so highly endowed with nerve force as this sheath. The large trunks of nerve passing to the lips often take a wavy course, and break up directly in the papillæ; others may be traced passing into the papillæ and running to their extreme point, forming loops close to the epithelium, there being as many as two and three nerves to each papilla (fig 1). It is, however, in the papillæ on the inside of the mouth that we observe the most beautiful distribution. Here the nerves run up apparently through the layers of epithelium to the free surface of the membrane, and terminate in loops. The papillæ appear to be entirely nervous; they are, as we described before, very long and delicate, and the nerves appear to fill them. There is no more beautiful object than the nervous papillæ on the inside of the horse's mouth (see fig. 2).

So far as I can determine, there are no definite nerve-endings. I have seen no corpuscles of Meissner, and of the many sections of skin examined I have only once seen a body resembling a Pacinian corpuscle. It was an exceedingly small object found in the upper lip, and corresponding in every particular with a Pacinian body; but I have only seen it once, so that it is certainly not the rule for the nerves to terminate in these endings.

Sebaceous glands are found everywhere in the skin; in that of the lips they are so numerous and lie so close together that they give the section quite a dark appearance. There would appear to be two glands to each hair. On the inside of the lips there are no sebaceous glands, though they are to be found on the margins, and here are of extreme length. In the skin of the

body, thighs, tail, and mane these sebaceous glands may be found two to each hair; in the mane they reach a considerable size, much larger than elsewhere; the increase in size is principally in length. In the wing of the nostril the glands are from ·012 to ·02 of an inch in length, and from ·005 to ·006 inch in breadth; on the body they are ·005 inch in length and ·002 inch in width; in the lip, ·01 inch in length and ·004 in width; and in the mane, ·04 inch in length and ·01 inch in breadth. There can be no doubt that I have seen branches of nerve supplying the sebaceous glands of the horse.

Sudoriferous glands are usually present in large quantities everywhere; in the lips, mane, and limbs, they are, however, but few in number. These glands stain easily with gold chloride; they are readily seen in the skin of the neck, where they are numerous and often completely surround a hair-sac. On the general surface of the body the glands are enormously developed, there being a continuous row of them under the hair-bulbs. The ducts of the glands can be readily seen coiling their way towards the surface of the skin. These glands are not numerous in the mane, and in the tail, though plentiful, they are very deep from the surface. In examining the skin of the limbs I had very great difficulty in finding sweat glands; they are few in number, and at one time I thought that none existed. The sweat glands on the general surface of the body lie at a depth of ·055 inch from the rete Malpighii; in width and length they are ·017 inch; the diameter of the tube is ·002 inch. In the nostril the glands are ·022 inch in length and ·012 inch in width, the diameter of the tubes being ·003 inch. Of the many sections made I have never seen the tube of the sweat gland terminating on the surface of the skin, so that I cannot say whether it is spiral, as in man, or not.

Lymphatic Vessels.—Great difficulty has been experienced in demonstrating the lymphatic vessels of the skin. All I can determine is that we have lymphatic spaces in the upper half of the corium, and that as we get deeper into its structure lymphatic vessels are large and numerous.

Hairs.—Especial attention has been paid to the arrangement of the hairs in the skin of the horse, for I have been anxious to try and determine how those changes which the coat undergoes twice a year are brought about.

The hairs found on the body are best divided into three classes—(*a*) the tactile hairs (feelers) found on the lips and muzzle; (*b*) the temporary hairs on the general surface of the body; (*c*) the permanent hairs of the mane and tail.

Tactile Hairs.—These hairs are very long, and project out some distance from the muzzle; they run for a considerable depth into the skin, and are enclosed in a globular white or yellow sac quite visible to the naked eye. The hairs are not hollow, nor can any trace of canals be seen; in this respect they differ much from the corresponding hairs which I have found on the trunk of the elephant, and which, I may here add, are also enclosed in large globular sacs. If we make a transverse section of a "feeler," we find that a large round or oval space exists in the subcutaneous tissue for its accommodation (figs. 5 and 6). The external sheath of the hair follicle is made up of fibres taking a circular direction, containing connective-tissue corpuscles. The sheath is ·002 of an inch thick; within this there is a space, often very large, as much as ·06 inch, traversed by prolongations which run from the internal to the external sheath of the hair follicle (figs. 5 and 6). When I first found this space I considered that it was due to portions of the internal sheath dropping out on making the section, but the examination of a very large number of specimens has convinced me that the condition is perfectly natural, and that the internal sheath is never in apposition with the external sheath of the follicle excepting by means of the processes described. In number the processes or prolongations are from ten to twenty, and extremely

delicate; their length is from ·006 to ·01 of an inch. They are made up of connective-tissue and filled with corpuscles. The internal sheath of the follicle surrounds the vitreous layer; this sheath is also composed of connective-tissue elements, and in width would be about ·007 to ·01 of an inch. Between the external and internal sheaths, I have seen portions of sebaceous gland.

Next comes the vitreous layer of the follicle, which is extremely narrow, and better seen in transverse than longitudinal sections; within this is the external root-sheath, made up of epithelial cells derived from the rete mucosum; those cells nearest to the vitreous layer are columnar; the others are polyhedral; all have a nucleus; the width of this layer is ·005 of an inch. The internal root-sheath comes next. I am not satisfied that it consists of the two layers described in man, and for accuracy it would be best to describe it as one layer. It appears to be formed of scales, though in some preparations it appeared vitreous; within this layer is found the hair. All these points are shown in figs. 5 and 6.

If we examine a longitudinal section of these "feelers," we observe that the external sheath of the follicle is derived from the corium; the internal sheath commences at the neck of the follicle, passes under the papilla, which either rests on it, or is formed from it, and extends up the opposite side; it is much thicker around the hair-bulb than elsewhere. The external root-sheath is readily seen to be derived from the epidermis; it does not extend down to the hair-bulb. In this section the space between the external and internal sheaths of the follicle is plainly seen, also the prolongations which maintain the hair in position (fig. 5). The sebaceous glands are found at the neck of the follicle, usually above the sac. Such is the appearance of this singular object. Staining with picro-carmine gives admirable results, and we can then see the parts perfectly differentiated. The hair is shown as a yellow body with a dark centre, the internal root-sheath is deep red, the the external root-sheath orange, the internal sheath of the follicle delicate pink, with scarlet connective-tissue corpuscles, the external sheath paler, with scarlet corpuscles; the whole presents a most beautiful object. The external sheath of the follicle is highly endowed with nerve supply; gold preparations show a most extensive plexus on the inside of the sheath. The hairs found in these sacs lie at a depth of ·125 of an inch from the outer surface of the epithelium, and are ·008 inch in width. In appearance they present no medulla, and are black or brown in colour. I cannot find that these tactile hairs are in contact with any special nerve-endings, but the extensive nervous supply of the outer sheath of the follicle is quite sufficient to account for their sensibility.

Temporary Hairs.—The sheath in which these lie is different from that of the tactile hairs. Here we have a narrow external follicular sheath on which the hair papilla rests: *there is no internal sheath*, but next comes the external root-sheath of epithelial cells, the external being columnar, the others polyhedral, and all nucleated; lastly, the internal root-sheath, which again appears as a single membrane (fig. 7). The hairs which fit into these follicles have a cortex and medulla; the cortex is vitreous in appearance, but the medulla consists of irregular spaces filled with pigment. Whilst the latter remains in them the part looks quite black, but when the pigment falls out the spaces are clearly seen (fig. 8). At their extremity the hairs terminate in a point, whilst in the skin they gradually increase in size as we get deeper, until they expand to form the bulb, which is hollow below to accommodate the papillæ. In the hair-bulb there is a quantity of pigment consisting of round black and brown cells; as we pass up the hair the cells decrease in number, until the appearance described above takes its place. The outside of the hair is covered by oblong epithelial scales, which form the internal

root-sheath. The colour of the medulla of the shaft depends upon the colour of the horse; in grey horses the medulla is black.

The papilla from which the hair grows fills up the hollow on the bulb, and consists of small round cells enclosed in a membrane which either grows from or rests upon the external sheath of the follicle. I am inclined to the former view.

The hairs on the general surface of the body are shed at regular intervals. If we examine the skin at this time of the year we find the majority of hairs, instead of presenting at their deepest part the usual well-known hair-bulb shape, are conical, and the extremity of the cone appears ragged; the hair has lost to a great extent its pigment, though a few large pigment cells can still be seen on the ragged bulb; the portion of hair in the skin is yellow, and it has lost its medulla. By these characteristics a hair in the process of being shed can be instantly recognised (fig. 7).

The first change which occurs in a shedding hair is that the shaft contracts just above the bulb, and as no more hair is at this time being formed from the papilla, the shaft gradually becomes separated just above the bulb, and the extremity of the hair becomes ragged. The papilla and bulb are now represented by a quantity of cells filled with pigment; the old hair becomes gradually forced up, taking with it the internal and external root-sheath; the cells of the latter spreading under the ragged bulb completely enclose it. In this way it is forced upwards, the distance between it and the papilla gradually becoming greater. Having got perfectly free from the old hair the papilla now commences secreting again, and we soon see a streak of cells extending above it. These rapidly assume the form of a hair, and we now notice that these hairs are coloured, presenting a great contrast to the colourless shedding hair which is still forcing its way outwards; the new hair rapidly grows upwards, and, pushing its way to one side of the external root-sheath of the old hair, causes the latter to become displaced, and the follicular sheath to bulge accordingly (figs. 7 and 9). Soon the apex of the new hair reaches the side of the old one, separated from it only by the remains of the old external root-sheath, and in a short time it touches the old hair, and the two are then seen lying side by side in the follicle, and the new hair, growing more rapidly than the old one is cast off, soon makes it appearance at the external surface of the skin, and we here have the singular appearance presented *of two hairs growing out of the one follicle* (fig. 9); the old hair gradually reaches the surface and is cast off. The new hairs attain a certain length, and then cease growing. After a few months they lose their vitality, and are replaced in just the same way as described above. Such is the singular method by which the horse sheds his coat twice a year.

On the general surface of the body the hairs have a width of ·0035 of an inch, the medulla being ·003 inch; the internal root-sheath ·0005 inch, the external ·002 inch, the vitreous layer ·0003 inch, and the follicular layer ·002 to ·004 of an inch.

The *permanent hairs* of the body are those of the mane and tail. These have exactly the same coverings as the temporary hairs, the internal root-sheath being single, and the internal follicular sheath absent (fig. 10). Both in the tail and mane the coloured hairs have a well-marked medulla; where there are white hairs in the mane or tail, the medulla is either absent or only represented by a black streak. In the mane and tail the hairs which die are recognised by exactly the same characters as the temporary hairs; here, however, we never see the new hair growing alongside of the cast-off one. The width of the mane hairs is ·005 to ·006 of an inch, medulla ·0045 inch, internal root-sheath ·0005 inch, external root-sheath ·003 inch, vitreous layer ·0005 inch, and follicular sheath ·003 to ·004 inch. The hairs of the tail are the widest in the body, being ·01 of an inch.

In the hair of the mane there is a well-marked internal root-sheath made up of oblong cells, which fit into each other most beautifully, and stain deeply with carmine; in some sections these cells are left in the follicle when the hair has fallen out; in others they can be seen closely adhering to the hairs. I have seen this appearance in other parts of the skin, but nowhere so marked as in the mane.

I have not attempted to describe the minute anatomy of the hoof, for this has already been carefully worked out by several able observers. I hope in a future paper to describe the histology of the skin of the elephant.

EXPLANATION OF PLATE.

Fig. 1. Section through the lip close to the mucous membrane, showing the shape and length of the papillæ, and the distribution of the nerves *n.n.*

Fig. 2. Section through the mucous membrane of the lip, showing the very long papillæ and nerve supply *n.n.*

Fig. 3. A section through the skin of the leg, showing the distribution of vessels *v.v.* to the glands, hair sheaths, and papillæ; the section through the hair is oblique.

Fig. 4. A section through the skin of the side; the sweat glands are very large.

Fig. 5. Longitudinal section through a "feeler" from the lip, showing the follicle and hair sheaths.

Fig. 6. A transverse section through the skin of the lip, showing the "feeler" in position; the muscular tissue in the surrounding parts is very large; at the bottom of the figure some nerves are cut across.

Fig. 7. A section through the skin of the side; the hair on the right is a new one, and its investing sheaths are the same in all hairs excepting "feelers"; to the left of the figure the old pale hair, with its ragged end, is being forced out, and causes the sheath to bulge.

Fig. 8. A section through a hair from the side, showing cortex and medulla.

Fig. 9. A section through the skin of the side taken from a horse shedding his coat; two hairs may be seen projecting from the one follicle; the bulging of the sheath is very marked.

Fig 10. A hair from the mane, showing its investing sheaths; only the sheaths on one side of the hair are drawn; *a* is the hair.

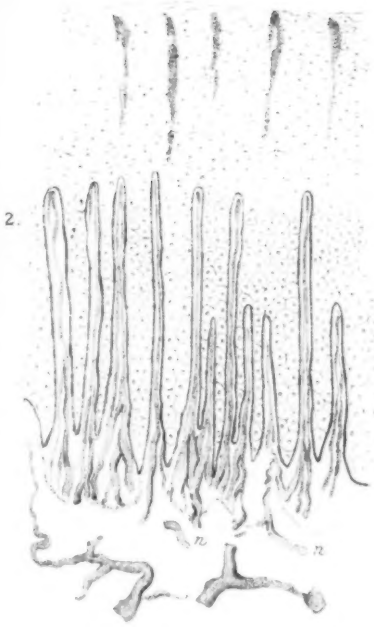
ON ABORTION IN CATTLE.

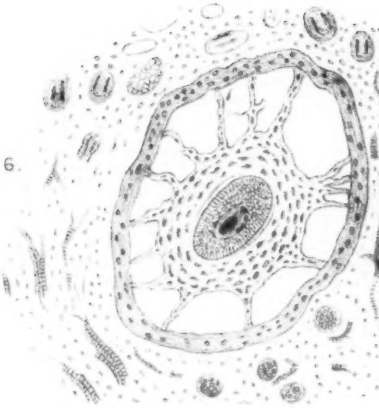
BY A. ROBINSON, F.R.C.V.S., GREENOCK.

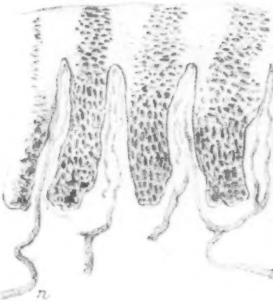
The following paper by Mr. Robinson, F.R.C.V.S., Greenock, was read in the discussion on Abortion, following a paper on that subject, introduced before the West of Scotland Veterinary Society:—

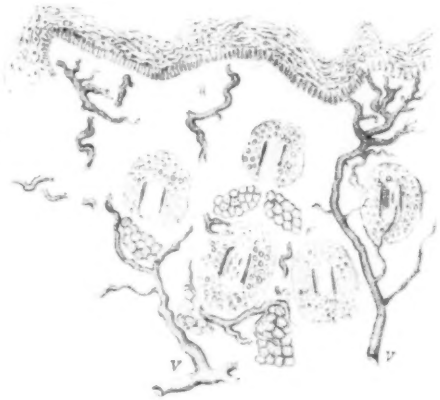
MR. PRESIDENT AND GENTLEMEN,—In proposing at our last meeting that the discussion on Mr. Constable's paper should be deferred until our present meeting, I was actuated by the belief that few subjects apart from those contained in the "Contagious Diseases (Animals) Act" were of greater importance to our agriculturalists; and from the short discussion that did take place I was forcibly struck with the necessity for our arriving at a more unanimous opinion as to one of the causes, if not the most frequent which determines abortion.

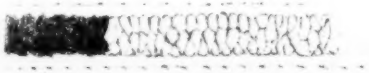
Nothing I think reflects greater discredit on our profession than the diametrically opposite opinions expressed in law courts by our members, even in matters which experimental research has placed upon the footing of established fact, and about which there ought consequently to be no divergence of opinion.











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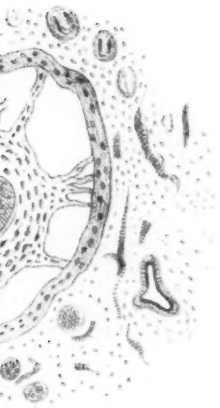

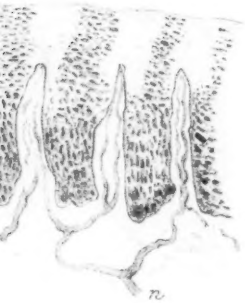

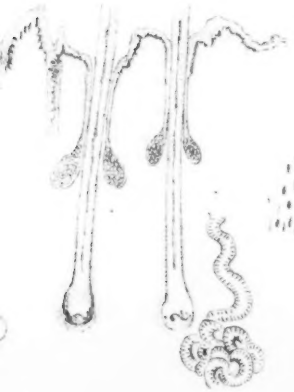

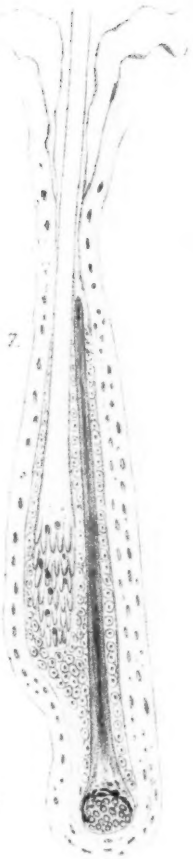

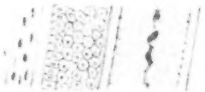

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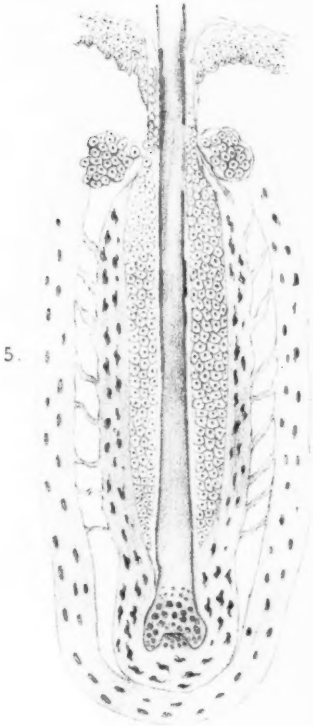

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P. Heath, Lith.r Edin.r

OF HORSE.

From very early times the philosophical, and, later, the medical world, was divided into two groups on a question of great moment, viz., the spontaneous or non-spontaneous generation of the lower forms of live, and it is only within recent years that the question may be said to have been to all intents and purposes settled in favour of the non-spontaneous theory. The advocates of spontaneous generation contended that the life which was observed in substances or liquids undergoing putrefaction originated in these substances spontaneously. Pasteur, however, by a series of ingenious experiments demonstrated to, and convinced the majority of, his most determined opponents, that the organisms observed therein were the germs or spores of germs floating about as dust particles in the air with always a tendency to fall towards the earth. That if these particles were excluded from putrescible liquids, by filtration through cotton wool, or by other means which he devised, those liquids would remain free from putrefactive change for any length of time. But that if the means of exclusion of these particles were removed, the process of putrefaction would shortly commence.

I merely remind you of this fact, because it may be said that, in consequence of its establishment, and the subsequent discoveries relative to contagious diseases, the scientific world is agreed as to the non-spontaneous origin of these diseases.

That form of abortion which most particularly interests us and our agricultural friends is now generally admitted to be contagious, and probably had we been more attentive to the popular belief its contagion might have been earlier demonstrated. Very few farmers who have had any experience of the subject will hesitate, or have hesitated for years to insist on us that it is contagious, and have often maintained that such-and-such a cow brought it into their byre. I believe that in matters of this kind we are often to blame for paying little heed to the opinions of farmers, who, although they may have no notion of the *modus operandi* in such matters, are often very shrewd observers of circumstances from which they make very practical deductions. It may, however, be said that from 1856, when Professor Bouley published his article of fifty-two pages in his veterinary dictionary, until the 15th of September, 1886, when Professor Nocard's report to the Minister of Agriculture appeared in the *Receuil de Médecine Vétérinaire*, little or nothing had been added to our knowledge, either in French literature or our own, on the subject of abortion.*

Professor Bouley, in his exhaustive treatise on abortion, divides it into enzootic and sporadic, and details all the numerous causes (discussing their physiological action) which have been described by Mr. Constable and the various authors and practitioners who have written and spoken on the subject. These causes, however, whether they be referred to conditions of the system, as Plethora, Anæmia, from excessive or defective nourishment, the influence of epizootics, as Pleuro-pneumonia, Rinderpest, Anthrax, etc., food materials altered by frost, cryptogamic fungi, tympany impaction of the bowels, wet lands with grasses impregnated with moisture, sudden and violent muscular exertion, overwork, variation of temperature, wet seasons, miasmatic atmosphere from the decomposition of vegetable and organic substances, immoderate draughts of cold water, when suddenly taken from over-heated stables, therapeutic agents, as purgatives, ergot, digitalis, etc., or fright,

* Surely this is a mistake. In the "Text-book of Veterinary Obstetrics," published by Bailliere, Tindall, and Cox in 1878, it will be seen that our knowledge of abortion had been largely added to since 1856, and that the contagiousness of at least one form of it had been experimentally and clinically demonstrated—that is, more than eight years before M. Nocard attempted to prove that it was a communicable disorder. We refer to page 204 of the work just mentioned. The writer doubtless overlooked this evidence.—ED. *V. J.*

spaying, or the influence of the male when worn out by too large service, may all be looked upon, in view of the light thrown upon the contagious form of the disease, as accidental causes, while his reference to contagion is somewhat as follows:—

"It is a fact long ago gathered from observation that when a cow aborts in a stable, abortion tends to repeat itself on a certain number of those which co-habit with her, and sometimes even attacks all the inmates of the stable.

"This mode of manifestation has caused it to be admitted that abortion could be transmitted in certain circumstances, after the manner of contagious diseases.

"What is there of truth in that opinion? In the rigorous sense of the word, the idea of contagion carries with it that of a principle, of a morbid germ, created or developed in the organism of a diseased animal, and which, when deposited in that of a healthy one of the same or a different species, develops and multiplies there, giving rise to disease in every way identical, in respect of its nature, its lesions, and its symptoms, and, like it, capable of transmission by the same means.

"A contagious disease is thus characterized by this fact—the existence of a particular principle not yet physically recognised, but recognisable by certain effects which it produces almost invariably every time it is put in contact with an organism suitable for its multiplication.

"Considered from this point of view, should abortion be ranged in the category of contagious diseases? In other terms, does there exist in the system of the cow which aborts a special principle which, when inoculated to a pregnant cow, would determine in her a general trouble, of which abortion would be the fatal expression, according to the same law which causes Glanders and Sheep-pox to manifest themselves after the inoculation of the special virus which belongs to one and other of these diseases?

"Put thus, it appears to us that the question ought to be answered in the negative; we do not believe, because no experimental fact has proved it, that there exists a virus in abortion like the virus of Glanders, of Sheep-pox, of Pleuro-pneumonia, of Anthrax, of Rinderpest, etc.

"But if this virus does not exist, and if consequently abortion is not contagious in the true sense which ought to be attached to the word, is the disposition to abort not transmissible by the intervention of a principle of another nature, which disengages itself from the body of the female in which this accident is produced, and which exercises a toxic influence on the system of pregnant females, of which the possible and common enough effect observed is the death of the fœtus and its expulsion before term? In other words, may the aborted females not give rise to putrid miasmata, resulting from the decomposition either of the fœtus or its envelopes, infecting the air of the stables which these animals inhabit, and exercising a deleterious effect on the organism of the other beasts in a state of gestation?"

M. Bouley goes on to reason this out, in calling to aid the testimony of various observers, and further proceeds to say:

"On the other hand, the fear of contagion is so firmly anchored in a certain number of minds, that often when a cow aborts, the precaution is immediately taken of isolating all the others with which she has been stabled, but that, nevertheless, the abortion continues to manifest itself on the cows which have not been removed in time to resist the infectious influence of the after-birth of the first.

"It cannot, then, be contested that there is an unknown cause to which it is our duty to direct the attention of observers.

"Here besides is the manner in which one of my correspondents, M. Darreau, a clever and impartial observer, expresses himself:—

"'It remains for me to speak to you of a singular abortion among cows,

which all the world knows, but as to the cause of which opinions are divided. This is how it behaves; several cows in a stable, and sometimes even the whole of them, abort at different periods of gestation, but more frequently after the fifth month; this accident may continue during several years, even five or six, but I have never seen it exceed this term. The causes, generally attributed to the insalubrity of the stable I at first believed in, and when then consulted, with the object of remedying matters, I immediately hastened to employ the means recommended in like cases, but to my great disappointment always without success. I have often since had occasion to recognise that I had not by these means been able to attack the real cause, for I have seen abortion make great ravages in stables perfectly kept, and in which the animals received copious rations. What is, then, that cause so occult? I am forced to believe that it is contagion, and certain facts tend to prove it to me. A splendid dairy, which leaves nothing to be desired in any respect, was a first year without known cause invaded by abortion. The following year, the proprietor foreseeing what was likely to happen, isolated a beautiful heifer six months gone, for whose produce he was greatly concerned, and placed her in another stable about sixty yards distant from the first. A new cow which he had bought was placed, on her arrival some days later, alongside of her; at eight months the heifer aborted, and fifteen days later the new cow. In the first stable, three cows out of five aborted, and two completed their term.'

"This fact does not solve the question of contagion, in the sense which we believe ought to be attached to this word, but it has a great practical value, because it demonstrates experimentally the dangers which accrue to pregnant females in the vicinity of those which abort.

"It is particularly when difficult questions of this nature arise, that one takes to regretting that our schools are completely destitute of the means of experimentation, which would permit doubtful matters of this kind to be cleared up, and to formulate, with a perfect knowledge of cause, the prophylactic rules from which the agriculturalist would so materially profit.

"That if, for example, they had at their disposal experimental dairies, they would be able to appreciate the influence on cows in gestation of any animal matters undergoing decomposition; if the effect of the infection by these matters differs in any respect from that which results from the decomposition of the cleansing inside or outside of the womb; and in the affirmative case, if the miasmata disengaged either by the dead fœtus or its envelopes had not special or even specific properties, in virtue of which, once introduced into the circulatory torrent, they would exercise their action more particularly and by a quite special affinity on the uterine apparatus of pregnant females; and also all other questions relating to this important matter. The question is asked, Is abortion contagious? and no experiment has yet been made, which furnishes in the smallest degree the solution of this problem, easy of solution notwithstanding if one possessed the means.

"What is the positive part of the aliments swallowed, moulded, covered with cryptogams? What is that of plants covered with dew or with hoar-frost, that of the diet too scanty, or that which is too abundant, etc., etc.? Practice furnishes plenty of important documents on these subjects, but how much more positive and more rapid would be the advance of science, if, under a rigorous experimental method, these inductions from practical observation could have been confirmed and the relative value measured, so to speak, of each of these causes."

Such, gentlemen, was the state of our knowledge over thirty years ago, and such it continued pretty much until about two years ago, when the report which I have already alluded to threw a new light on the contagious form of the disease, and although much remains to be done, much that was suggested as wanting by that article has been most satisfactorily demonstrated.

In December, 1885, the French Government deputed M. Nocard to study the epizootic outbreak of abortion in the beautiful Nièvre breed (race Nivernaise), and to inquire into the causes of that disease and the means to avoid its ravages.

As already stated on the 15th of September, 1886, there appeared in the *Receuil* a copy of Professor Nocard's report to the Minister of Agriculture, and from it, it seems that the Government had previously held an inquiry, to which the majority of the veterinary inspectors of the department had contributed. From this inquiry, the papers connected with which had been handed to M. Nocard, it would appear that while only the minority of the veterinarians invoked contagion, the others not positively denying it, the causes ascribed might be classed under three groups.

1st. Precocity, tendency to fatten, selectness of breed *(l'aristocratie de la race)*, qualities only to be attained at the expense of domestication and the aptitude for procreation.

2nd. To crossing, and particularly to crossing with Durham bulls

3rd. According to a small number of the veterinary surgeons of Nièvre, abortion is due to the ingestion of graminaceous forage, on the ear of which is developed a fungus similar to that produced by the ergot of rye.

In answer to the first, Prof. Nocard arrives at the conclusion that, while fatness may be a modification favourable for the evolution of the evil, it is not of itself sufficient to cause it.

From his investigation of the second group, it would appear that in numerous establishments where crossing with the Durham bull was the rule no abortions had taken place, and that, further, in certain districts, where the disease appeared to have followed the use of the Durham, he had previously served in establishments where abortion existed; the proprietor of one of the establishments, on being questioned, recollected that he had obtained some cows from a doubtful source, and that it was one of them which first aborted.

With regard to the third, he says it merits a closer study, more particularly as an epizootic outbreak of ergotism recently occurred in America, of which abortion and dry gangrene, similar to that produced by ergot of rye, was a feature.

Several reasons, however, militate against this hypothesis.

(a) Abortion takes place where the animals are housed long before autumn, where the herb is cut before the maturing of the ear; that is to say, before the ergot has time to form, when, of course, it can have no influence on the development of the disease.

(b) By contrast, other farms can be cited, where the animals are allowed to remain at pasture until winter, consuming the herb in all its conditions, which is never cut, and without abortion being there observed.

(c) It is the uterine action of ergot of rye that caused it to be thought by analogy that the ergot of graminaceous forage might provoke the contraction of the gravid uterus and the expulsion of the fœtus.

However, it has never been experimentally demonstrated that these ergotized grasses possess an identical action to that of ergot of rye; and, further, that if the ergot of rye provokes the energetic contraction of the uterine muscle after the expulsion of the fœtus, nothing proves that it has an analogous action on the gravid uterus. For his own part, Prof. Nocard has never succeeded in causing a pregnant female to abort, by no matter what dose or mode of administration of the ergot of rye.

Before recording his actual work in connection with this investigation, Prof. Nocard enters into a consideration of the symptoms and course of the disease, in which he profits by the writings of others, and notably of M. Saint-Cyr and numerous correspondents from the districts where the disease mostly prevails. A review of this portion of the report may prove of interest to you.

As a general rule, abortion appears after the introduction of a pregnant animal newly purchased. If this cow aborts, one of the old stock, which had all until now gone their full term, aborts next, and then a second, a third, a fourth, and so on. This stable is henceforth infected, and the disease will reproduce itself with aggravating constancy during several consecutive years. A number of stables can be cited where for eight, ten, and fifteen years abortion affected a quarter, a third, and a half of the pregnant cows.

It is usually the cow next to the newly bought-in one which is the second to abort. It does, however, sometimes happen that a cow which is not in direct contact is the second; the disease notwithstanding frequently, and sometimes exclusively, attacks the animals situated on the side of the stable on which the first aborted.

If pregnant healthy animals from a district in which the disease does not exist are brought into an infected stable, it may happen that these cows, provided they be near their time, calve at the normal period; the others for the most part abort. Nevertheless it may be deduced that the disease must have a pretty long period of incubation. M. Pomneau, a farmer near Saincaize, took on lease a steading previously devastated by abortion, into which he took thirty-two cows, from six to eight months gone; none of these cows aborted. He had thirty-two calves, which he was able to rear, but the second year, eleven out of thirty pregnant cows aborted from the fourth to the eighth month of gestation. It is ten years since then, and the disease continues its ravages in the same proportion. Numbers of similar cases might be cited, but he only mentions two others as being particularly demonstrative. Near Provins (in Brie, where, however, the disease does not prevail in the epizootic form), a brave woman reared her family out of the produce of four milk cows. For many years all the cows which she had attempted to serve aborted. She took the judicious course of fattening the cow of which the udder failed, and bought, to avoid abortion, a cow as near term as possible. One fine day her place took fire, and burnt stable, cows, and all. Fortunately being insured she rebuilt in another corner of the court, bought new cows, and since then has had no abortion.

In a district in which abortion is unknown a proprietor in Chuelles, living for twenty years on the same farm, never had even a case of accidental abortion, when, in July, 1884, he bought a cow seven months pregnant from a farm in Chatillon-sur-Loing, about twenty miles distant, where abortion had prevailed for four or five years. The cow aborted in the same month, and in the month of September her neighbour, five-and-a-half months gone, also aborted. These two cows, sold to the butcher, were replaced by two others, which, after some time, aborted, and then five which he had previously possessed aborted, when from five to seven months gone. Finally, another and last cow, recently purchased, and separated for a month from the others, when placed in the infected stable along with the others aborted, after being there six weeks.

Abortion rarely takes place before the fourth month, but from that on it may happen at any period of gestation.

As a very general rule in an infected stable, the period at which abortion takes place in each succeeding year is later than that of the preceding. In other words, if last year a cow aborted in the fourth month of gestation, the chances are that it will happen this year at the fifth month, then next year at the sixth, then at the seventh, then at the eighth, and then the ninth.

Thus in the steading of M. Michel, proprietor at Azy, where abortion prevailed for twelve years, attacking good and bad years from a third to a half of the pregnant cows, the period of pregnancy at which they aborted was later each year than the preceding, until in the season of 1884 and 1885 there was not a single abortion; all the calves arriving at term were born vigorous

and well constituted, but the first and second days after their birth fourteen out of thirty-two were attacked by diarrhœa, and commenced, as abortions do, to bellow, and died in twelve, twenty-four, and thirty-six hours. They melted while you looked at them, said the proprietor. M. Nocard had no doubt but that these calves died from the same cause as abortions, born capable of life at the seventh and eighth month, but at that time he had not the means of verifying that induction. This gradual retardation in the period at which successive abortions take place, has nothing fixed or regular about it, but attentive breeders have been able to make that general observation.

The age, the breed, the state of fatness or leanness, seem to have no influence on the development of the disease, and it seems to M. Nocard contrary to what has been generally admitted that heifers are equally if not more exposed to contract the disease than those which have already borne.

The cow about to abort does not even seem indisposed; she conserves her gaiety, eats, drinks, ruminates, and milks as usual. However, an attentive observer is often able to predict that such-and-such a cow is on the point of aborting: the vulva is slightly swollen and œdematous, the ischii more prominent, the animal loosens, and, it a heifer, the teats prepare as if parturition were imminent.

The expulsion of the fœtus takes place without difficulty; the mother seems not to notice it, neither ceasing to eat nor ruminate. The abortion is too small to be arrested in the passage, or to require violent efforts for its expulsion. When very early the fatal membranes come with it; later on, the contrary; cleansing is slow, and most frequently requires to be artificially removed; the operation being generally more laborious than after parturition at term; the membranes are very adherent, and the veterinary surgeon requires to enucleate each cotyledon by itself, and often the membranes come away in shreds. The observations published give full details on the condition of the membranes or amniotic fluid, and are silent on the condition of the uterine mucous membrane of aborted cows. This is easily understood, as the cow not being ill from abortion, the occasion for examination of the uterus does not present itself, and as she never dies except as the result of retention of the placenta, it is very difficult to distinguish the lesions of retention and septic fermentation of the placenta from those due or special to abortion; on the other hand, the expulsion of the fœtus being very rapid and without any difficulty, there is rarely a chance of being present at a case of abortion, and thus there is nowhere any mention made of the condition of the amniotic fluid. It is simply recorded that the afterbirth is usually much altered, macerated, covered with pus, and that the cow voids, for a long time after cleansing, dirty purulent matter.

One would be inclined to think that the uterine mucous membrane, and also the cotyledons, would present similar lesions, but that induction has not been verified.

When a cow aborts, the owner knows very well that there is little chance of conserving her as a reproducer, for either she comes a bulting and is served several times a month without conceiving, or if she conceives, aborts afresh. Very rarely does a cow after once aborting go her full time, and give birth to a well-formed calf. So the majority of breeders usually prepare such animals for the butcher, which is the most honest and wisest proceeding; some, however, when it is not a first calf, cause a calf to be adopted, and send the animals to market, thus spreading the disease. When it is the question of a prize animal, it is easily understood that the breeder hesitates to prepare it for the butcher, and experience proves that it is wise to keep it from the bull for some months, when there is more chance of the service proving successful. As to the calf, it is usually dead when abortion takes place. Sometimes, however, it happens that the abortions are expelled living, well formed, and

vigorous in appearance; nevertheless, four times out of five, the first, the second, or the third day after birth they commence to bellow in a strange and continuous manner, cease to suck, are attacked by diarrhœa, and die in a few days, sometimes even in a few hours. This particular bellowing seems to be the prognostic sign of a fatal termination. Those which do survive generally remain unthrifty, and at three years old are scarcely the value of an ordinary yearling, so that there is really no interest in conserving them.

Now, gentlemen, as I am afraid I may have already exhausted your patience, I will not follow Prof. Nocard through his numerous observations and experiments, but will simply indicate the problems he set himself to solve, and the means he employed to arrive at their solution.

(1) Was the disease a general disease of the pregnant cow?

(2) Was it an affection of the generative organs of the mother?

(3) Was it a disease of the fœtus and its envelopes?

Nothing in the living animal would indicate that it was a general disease; all the functions are normally performed, the temperature does not rise above the tenth of a degree, the urine contains neither sugar nor albumen; the blood, the milk, and the different parenchyma remain normal. The histological examination and the sowing in the different fluid and solid cultivation materials used in microbiology do not reveal the presence of pathogenic microscopic organisms. In none of the *post-mortems* was there a trace of any lesion on the peritoneum.

In determining the question as to its being a disease of the genital organs of the mother, the investigations he considered of most were

(1) The *post-mortem* of cows just aborted.

(2) The *post-mortem* of cows about to abort (as many as possible at the first calving).

(3) The *post-mortem* of cows having aborted the previous year, and not afterwards found capable of conception.

A cow at her first calf which aborted, but did not cleanse, having been killed, on making a *post-mortem* he placed a ligature behind the neck of the womb, and removed it, hermetically closed on its contents. With the precautions recommended by M. Pasteur, and which were scrupulously observed all through his experiments, he removed some blood, some milk, and some urine, and having found all the other organs and viscera normal, he removed the womb in a clean linen towel, and the fluids in sterilised vessels. He burnt the peritoneal surface of the womb to the extent of about twenty centimetres, and having heated his knife in a flame, he made a fine incision through the walls, and when barely open he observed a flake of fibrinous muco-purulent material of a bright yellow colour; with a pair of forceps, also passed through the flame, he caught this flake, and placed it in a sterilized test-tube. Pressure caused others to appear, which he treated in the same manner.

He then made a larger incision, and exposed the cotyledons, all still covered with the fœtal placenta firmly adherent.

He had difficulty in separating them, and found the placental villi of a dirty white colour, and as if infiltrated with pus or macerated, all the cotyledons being the same, and at their base and around their pelicles there existed a great quantity of these yellow flakes of fibrinous muco-purulent material, frequently recorded as passing from the vulva after abortion. The cotyledon, after being stripped of its placental covering, was firm, rosy, and filled with large deep follicles; pressure caused to ooze out some drops of purulent matter, softer and more easily disposed between two cover-glasses than those which existed free at the base of the cotyledons. The scraping of the cut surface left by the bistoury gave a milky juice, white and homogeneous, analogous to cancer juice. After cauterisation of the surface of a cotyledon, he collected by inspiration, in finely drawn-out and flame-heated

glass tubes, a quantity of cotyledonary pulp, which he sowed in veal and fowl broth and also in peptonised gelatine tubes.

He sowed also some of the puriform matter, some blood, and some milk. He also excised and deposed portions of cotyledons covered with placenta in absolute alcohol.

Coloured with methyl blue he found the puriform matter to consist of a mass of epithelial cellules and of leucocytes, imprisoned in a mucous and fibrinous network, a number of micrococci, isolated, double, and in short chains, consisting of three, four, and five cocci; here and there, also, a few short, thick bacilli, isolated or associated two by two. In the cotyledonary juice it is these bacilli which are found, almost to the entire exclusion of the micrococci. In the juice scraped from the mucous membrane these organisms existed in about equal quantities. After forty-eight hours the sown tubes exhibited an abundant cultivation.

Those sown with the cotyledonary juice, cultivated in a state of purity, exhibited the short, thick, geminated bacillus above referred to. Those sown with purulent matter showed, on the contrary, a mixed culture of micrococci and bacilli, the micrococci being the more abundant, etc., etc.

The tubes sown with blood and with milk conserved their limpidity.

Similar results were got from the other experiments, but it is important to mention that in the cow which had aborted the previous year and was afterwards sterile, a mixed variety of micro-organisms was found, and that the liquid obtained by scraping the uterine mucous membrane gave a slightly acid reaction, and M. Nocard points out that it is probably due to this condition that the animals remain sterile, as the spermatozoæ cannot maintain their vitality in other than an alkaline medium.

Cows from a district where this abortion did not exist had no micro-organisms between the mucous membranes and the fœtal membranes, neither in first calvers nor in those which had already borne.

In his investigations on the calves, he found that neither the blood, bile, pericardial, pleural, nor peritoneal serosity, the pulp of the spleen, the liver, kidneys, nor mesenteric ganglia yielded cultivations, but from the liquid of the stomach and intestine and the cerebral bulbs he was able to obtain cultures of the same micrococcus as he had found in the liquor amnii and grumous muco-purulent matter.

It was, of course, necessary to select abortions that had been born dead, and had consequently never breathed for these investigations, for as soon as extra-uterine life commences micro-organisms are always to be found in the alimentary canal of all animals.

Professor Nocard believes that the peculiar bellow of the calf, like the altered voice of the dog in Rabies, is due to cerebral disturbance, and in the case of the calf to the presence of these micrococci.

He also believes that many cases of death from Diarrhœa in newly-born calves result from this cause, and he has examined the bulbs of animals that have died of the disease and found a microbe in all respects identical, so that he considers it is a question whether it is not one and the same disease, evolving at different epochs in the life of the animal. The existence of micro-organisms in the alimentary canal of the aborted fœtus, prior to expulsion, was made clearly evident in a simple experiment by Prof. Nocard. This experiment was indicated from the knowledge that in the healthy fœtus that had neither drunk nor respired there existed no organisms in either the respiratory or alimentary tracts.

On the 9th February, 1886, Prof. Nocard received the fœtus of a cow which had aborted on the night of the 7th February. This abortion was expelled dead, and had neither respired nor swallowed. He suspended it in the court of the Alfort Shoeing Forge by one of the hind limbs. On the 11th, at one

o'clock afternoon, he caused it to be taken down, with a view to making a *post-mortem* examination. It was in a state of complete putrefaction. A reddish frothy serosity with an insupportable odour flowed from the nostrils and the mouth. The skin was distended and crepitant. He sent it to the knacker.

On the 3rd of May he received from the slaughter-house the gravid uterus of a Normandy cow in good condition. He extracted a six months' fœtus, and suspended it in the same place as the abortion had been hung. Until the 8th of May it remained in pretty much the same condition, with no discharge from the nose or mouth. The skin, however, was slightly slimy (soapy) and had a fœtid odour. With rigorous precautions he opened the abdomen, and took from the posterior vena cava several "pipettes" of dark fluid blood, destitute alike of odour and of gas bubbles. This blood, sown in fowl and chicken both, pure and peptonised, gave no trace of cultivation, ærobic or anærobic. Besides, the most minute examination of the digestive or respiratory organs revealed no trace of putrefaction. These comparative experiments, frequently repeated, yielded always the same result, thus proving that pre-existence of micro-organisms in the alimentary and respiratory tracts play the principal part in the putrefaction and destruction of carcases.

It is also another proof of the pre-existence of microbes in the digestive tube of abortions (during intra-uterine sojourn), and consequently of the microbic nature of the disease.

His advice with regard to the prophylactic measures to be adopted merits a trial from all of us who may have occasion to advise with regard to this disease.

Every week the floor of the stable ought to be scraped and washed thoroughly, and then watered with a strong solution of sulphate of copper.

Every week a vigorous injection should be thrown into the vagina of the pregnant cows, with a clyster pipe full of warm liquid, of which the following is the composition:—

Distilled water, 20 litres.
Glycerine } àà 100 grammes.
Alcohol à 36° }
Bichloride of Mercury, 10 grammes.

Dissolve the bichloride of mercury in the alcohol and glycerine, mix with the water and agitate well. This solution should be kept in a wooden barrel or other receptacle and put out of the way of animals and children.

Each morning when the animals are being dressed, they should be carefully washed with the above warm solution around and over the anus, vulva, and inferior surface of the tail.

In the case of a cow which has aborted, she ought to be cleansed by a veterinary surgeon, who should exercise great care, and afterwards irrigate the uterus with a long caoutchouc tube carried to the fundus, and through which should be poured eight or ten pints of the tepid solution above referred to. The fœtus, and also the membranes, on removal should be immediately destroyed, either by burning or boiling.

Where these measures have been carried out they seem to have yielded good results, but Prof. Nocard says that it is yet too soon to speak positively, and also that to make his experiments conclusive some experimental inoculations are required, which he promised would be carried out, and the result made known when completed.

And now, gentlemen, thanking you for your patient hearing, I place, without further remark, before those of you who may not have had an opportunity of becoming acquainted with these experiments, the result, so far, of Prof. Nocard's labours, in the hope that it will be productive of an ample discussion.

THE FELLOWSHIP OF THE ROYAL COLLEGE OF VETERINARY SURGEONS.

It having been represented to the Secretary of State for War that the Royal College has instituted a higher degree in veterinary medicine than that of membership—viz., that of Fellow—and that the Fellowship is only awarded to members after they have been five years in the practice of their profession, and have successfully undergone a qualifying examination, he has sanctioned the proposal to place the letters F.R.C.V.S. after the names of those veterinary officers who are or may become Fellows, in the Quarterly Army List. This generous concession, while it is an acknowledgment by the Army authorities of the value of the title, places veterinary officers who may possess it on the same footing as medical officers who are Fellows of the Royal College of Surgeons (F.R.C.S.), or Doctors of Medicine (M.D.), and have the corresponding initials placed after their names in the official Army List.

The possession of this distinction will exempt veterinary officers from the examinations prescribed for promotion to a higher grade.

THE ROBERTSON MEMORIAL FUND.

At a meeting held by the students of the Royal Veterinary College on the 18th January, it was resolved that the memorial to the late Professor Robertson should take the form of a marble bust. A committee was then appointed to inquire as to the probable cost of the same.

They have since reported, that having conferred with Mr. Birch, A.R.A., the memorial will cost one hundred and twenty-five guineas. It is therefore hoped that intending subscribers will forward their donations to the treasurer, Professor Axe, in order that the bust may be placed in the museum of the College by the 1st of October next.

W. J. Moran, M.R.C.V.S., *Hon. Sec.*

NEW REGISTER OF THE ROYAL COLLEGE OF VETERINARY SURGEONS FOR 1888.

We may remind our readers that the new Register is now ready for issue. As it contains the new regulations for the examination of students, and the bye-laws as passed by the Council in January, it will no doubt be read with more than ordinary interest.

It can be obtained either of the Secretary, Royal College of Veterinary Surgeons, Red Lion Square, London, W.C., or of Messrs. Baillière, Tindall, and Cox, King William Street, Strand, London, W.C. Post free, two shillings.

Proceedings of Veterinary Medical Societies, &c.

ROYAL COLLEGE OF VETERINARY SURGEONS.

Quarterly Meeting of Council, held April 3rd, 1888.

Sir Henry Simpson, President, in the chair.

Present.—Professors J. Wortley Axe, G. T. Brown, W. Duguid, W. Pritchard; Dr. George Fleming; Messrs. T. Briggs, J. S. Carter, J. Roalfe Cox, E. C. Dray, Thomas Greaves, W. F. Mulvey, A. H. Santy, J. F. Simpson, W. Woods, F. W. Wragg, and the Secretary.

The Secretary read the notice convening the meeting.

On the motion of Mr. DRAY, seconded by Mr. SANTY, the minutes of the previous meeting were read and confirmed.

The SECRETARY stated that he had received letters from General Sir Frederick Fitzwygram; Professors Walley, McCall, and Williams; and Messrs. Peter Taylor, Perrins, and Barford, regretting their inability to attend the meeting.

Correspondence.

The SECRETARY read letters from Professor McCall, Mr. C. Rotherham, and from the Board of Trade.

Presentations.

Mr. SANTY said that, on behalf of the Norfolk and Eastern Counties and the Lincolnshire and Western Counties Veterinary Medical Societies, it was his pleasing duty and privilege to present to the Royal College of Veterinary Surgeons a stained-glass window, which had been placed on the right-hand side of the Council Room. The subject treated was a veterinary surgeon examining a horse, which was made to appear as jaded as possible, to carry out the idea of a sick animal. After the stable-master's explanation about the animal, the veterinary surgeon appears to be cautioning him for the future, telling him never to leave till to-morrow what might be done to-day. There was a Latin inscription under the subject to that effect. In the background a shepherd was seen driving a flock of sheep for the veterinary surgeon to examine. The subject was surrounded by an oval interlaced with the monograms of the counties by which the window was presented.

The PRESIDENT, on behalf of the Council, moved that a hearty vote of thanks be accorded to the donors of the window.

Mr. GREAVES seconded the resolution, which was carried by acclamation.

The SECRETARY stated that the following presentations had been made:—By Mr. G. A. Banham, on behalf of the National Veterinary Association, a copy of the "Proceedings" from the commencement, five volumes; a pamphlet on "A Monograph on 'Surra' or Pernicious Anæmia in the Lower Animals," by Mr. R. W. Burke, of the Army Veterinary Department; and a "Calendar of the Pharmaceutical Society of Great Britain."

Mr. DRAY moved that the presentations be accepted, and that the thanks of the Council be accorded to the donors.

Mr. WRAGG seconded the motion, which was agreed to.

Report of the Committee appointed to arrange the Annual Report.

The draft report of the Committee was discussed and amended by the Council.

Mr. DRAY moved that the Report as amended be adopted.

Mr. CARTER seconded the motion, which was agreed to.

On the motion of Mr. J. F. SIMPSON, seconded by Mr. BRIGGS, Professor Brown was added to the Annual Report Committee.

It was resolved that a printed draft of the report be sent to each member of the Committee.

Report of the Registration Committee.

The PRESIDENT said he did not think there was any necessity for going through the report. He thought it would be best to pass a resolution that the Committee should be empowered to act in such a way as it might think desirable with regard to complaints submitted to it under the Veterinary Surgeons Act.

Mr. DRAY moved that the Registration Committee be empowered to deal with all cases brought before it, and carry out the necessary proceedings.

Mr. MULVEY seconded the resolution, which was agreed to.

Report of the Finance Committee.

The SECRETARY read the report.

Mr. DRAY presented the quarterly statement of accounts.

The PRESIDENT said £1590 had been advanced from the General Fund, and the Finance Committee felt that the time had at last come when they could simply transfer the amount advanced to the Building Fund, and thereby declare the College to be out of debt. It was a most important recommendation, and had not been adopted without grave consideration on the part of the Finance Committee. The other recommendation of the Committee was with regard to the Consols. They all knew that the Government were reducing the rate of interest, and the College had merely been asked to assent to the conversion of the Stock.

Mr. GREAVES said he should be exceedingly pleased to see the College clear of debt, and he saw no other way but to adopt the course which had been suggested by the Committee. It would simply be a transfer of the amount from one pocket to the other, and it was a bounden duty they owed to the profession to see that the College was clear of debt.

Mr. DRAY moved the adoption of the Financial Report.

Professor PRITCHARD seconded the motion, which was agreed to.

The following gentlemen were nominated as scrutineers to act at the election for members of Council in May :—Mr. William Hunting, Mr. Percy Spooner, Mr. Wm. Peacock, Mr. A. Rogerson, Mr. Rootes, Mr. Harrison, Mr. Reid, Mr. W. H. Farrow, Mr. Sidney Slocock, Mr. Rogers, Mr. Raymond, and Mr. Pack.

Annual Dinner.

The PRESIDENT said that the Council had already appointed a Dinner Committee, and he wished to bring a matter before them with regard to the forthcoming annual dinner. The following resolution was at present on the minutes : "That no expenses incurred at the annual dinner be defrayed by the Royal College of Veterinary Surgeons in future without the consent of the Council." He would like to ask the Council whether under the special circumstances of the year they might not indulge in a somewhat grander dinner than they had for the last three or four years. He had taken upon himself to invite the Prince of Wales to dine with them, but he had received a reply that His Royal Highness would be in Glasgow on the 7th of May. He had invited the Duke of Cambridge, but as yet he had received no reply from his Royal Highness. He thought the matter might well be left with the Dinner Committee to carry out such arrangements as they might consider desirable.

Mr. GREAVES said he perfectly agreed with what the President had stated. This being a Jubilee occasion the whole profession would look upon it as an honour if the Duke of Cambridge were to dine with them, and he hoped that the Council would sanction the carrying out of the necessary arrangements.

Mr. DRAY, while expressing a wish that any member of the Royal Family would honour the College by his presence at the dinner, hoped the Council would not launch out into unnecessary extravagances.

Mr. WRAGG said he agreed with Mr. Dray, and was much opposed to any money being taken out of the funds of the College to be spent in the way suggested.

Professor BROWN moved that a sum of £25 be placed at the disposal of the Dinner Committee for the purposes of the annual dinner.

Mr. GREAVES seconded the motion, which was agreed to.

Obituary.

The SECRETARY read the Obituary List.

On the motion of Mr. DRAY, seconded by Professor BROWN, it was resolved that a letter of condolence be sent to the family of the late Mr. T. W. Gowing.

Notice of Motion.

Mr. J. F. SIMPSON gave notice of the following motion: "That to enable the Registrar to issue a corrected list of existing practitioners who are entitled to have their names entered in Register No. 3 under the Veterinary Surgeons Act of 1881, he be instructed to obtain the required information under the power given to him by Section 5 of the Veterinary Surgeons Act of 1881, that the necessary inquiries commence forthwith, and that the Registrar be allowed such additional clerical help to enable him to make the necessary investigation as may appear reasonable to this Council."

The SECRETARY stated that up to date the following nominations of gentlemen had been received for election on the Council at the annual meeting:—G. Fleming, W. Pritchard, G. A. Banham, W. Wilson, W. Williams, T. Greaves, J. F. Simpson, G. W. Carter, G. T. Brown, Benjamin Cartledge, Benjamin Russell, J. McCall.

Mr. GREAVES moved a vote of thanks to the President for his conduct in the chair, and the Council adjourned.

LANCASHIRE VETERINARY MEDICAL ASSOCIATION.

(*Continued from page* 301.)

Need I allude to the ignorance and prejudice we have to contend against? Take an example: The other day a young horse was brought to me with some little tumefaction of the gums. I was urged to burn out the offending buccal membrane, being met with the impudent rejoinder that lancing was of no use, as it would come again. I need scarcely tell you that I was proof against the desire that I should repeat the barbarism of the old farrier; but what an example of the inheritance of ignorance into which many have come with respect to the treatment of the lower animals! Would any sane parent have requested a surgeon to treat in a similar manner the teething troubles of his own child?

Then, again, I hold that our nomenclature is lamentably imperfect and misleading. Take, for instance, the terms Rot, Scarlatina, Milk Fever, Pink-eye, Spavin, Braxy, Mad-staggers, Red-water, Grapes, Distemper, Megrims, Louping-ill, etc., etc. How would we translate some of them to a foreign contemporary, or with what diseases would a surgeon revert to mentally in order that he might compare them?

Not only is this technical language vague and misleading as a means of expression, but it has a very retarding effect on the proper differentiation of one disease from another; which separation, and the power possessed by the surgeon to recognise it, goes so far towards rational and successful treatment.

Another obstacle to the advancement of our art is to be found in the few inducements which are held out as rewards of sterling work, original research, or brilliant surgery.

At present we are a profession of general practitioners, almost without specialists and consultants, and the highest title we are possessed of is that of Fellow.

Quite recently I am aware that honour has been done us in honouring some of our distinguished members by knighthood, C.B., LL.D., and, latest of all, by the Companionship of the Order of St. Michael and St. George; but I want to know why we ourselves cannot honour those who merit the same by instituting degrees of our own? Surely we can raise a standard which will carry with it a weight and respect far eclipsing the M.D. degree of various foreign universities which are admitted in the medical profession! In the Fellowship degree to which I have referred, doubtless a definite advance in the right direction has been made; it is a distinct stimulus and an honourable

preferment; but I wish, with your permission, to criticise for one moment the wisdom of making this examination the portal alike to the Council as to the Examining Board. I will do this in no carping spirit, and say at the outset that it was done for the good of the profession and that only.

In the nature of things, I think that our reputation as a body will always be judged by the skill and status of the general practitioner, rather than by that of the veterinary *savant*. This reason alone seems to demand that members should at least be represented by some (be it a fixed number or otherwise) of the great class to which they belong; but apart from this, a Council should be largely composed of the elders of a body corporate—men who by experience and by long continuance in well-doing have gained the confidence of their brethren. These qualifications only come with years, as also does that judicial condition of mind so essential for the office.

Now, as a rule, unless a man take his fellowship soon after the membership, is it not true that he may advance in knowledge, and yet be less capable of expressing the same in an examination? Then, again, there is a natural repugnance with advancing years to submit to examination, and this is intensified should there be younger and less experienced men on the Examining Board.

Not infrequently good men rise up in every profession, who in the earlier years of their career can neither spare the time nor the money necessary to obtain this higher degree; but as time advances they are found possessors of wealth, leisure, and ripe experience, well adapted in every respect for the honorary and not inexpensive position of Councilman.

I wish now to leave this question with you, gentlemen, not as one I would deem wise to re-debate, but as one worthy of mental digestion as affecting our highest interests; at the same time we must guard against doing injustice to those who were stimulated to take the examination as the only means of reaching the Council chamber.

With respect to our examiners, I think we are all agreed that the rank of Fellow should be the lowest on the Board. For my part I do hope that at no distant date we shall have names with the affix thereto of M.B., M.D., and B.Sc., graduates of our own R.C.V.S.

At this point another question presents itself, and one which is much nearer home. I refer to the composition of the Board with respect to scientific savants and medical men being thereon. In other words, are we not capable of conducting our own examinations by ourselves exclusively? The question has been answered in the affirmative, with respect to the higher position of Fellow; are we not therefore logically compelled to admit the fitness of our own examiners for this duty? And in relegating it to them, are we not taking a wise course?

The stimulus to all work is the hope of reward, in some form or other; and monetary remuneration is by no means the highest.

If we insist that the examiners shall all be veterinary surgeons, then we offer so many more posts of distinction and honour as examiners, and a greater incentive to take the Fellowship will be created at the same time.

Can we conduct these examinations with credit and efficiency? Let us look into it a little more closely. At the present time veterinary surgeons examine, and must of necessity examine, in the most vital subjects which qualify us for our sphere in life. If, then, the profession undertakes the essential part of the examination, does it not seem reasonable that the accessory subjects may safely be entrusted to their care also? The greater quantity usually includes the lesser.

The only objection which, to my mind, can be urged against the proposition is that the collateral subjects of physiology, chemistry, and botany are each of them so vast, so absorbing, and so changeful by their progression,

that unless a man devotes himself entirely to their study he quickly becomes *passé*, and behind current speculation, theory, and fact.

We are told that the professor of these subjects will have to teach his pupils down to the level of the Examiner, rather than advance them to the pinnacle of present science.

If we had no Fellowship degree by examination, there would appear to be some force in the contention, though in the medical profession there are examiners of the highest rank and culture without this condition; but we have it, and it was instituted for the very purpose of selecting from our ranks men who were pre-eminently forward in science.

Again, be the professor ever so learned and advanced, he must teach the fundamental truths of his subject, and gradually build in the older and well-proven text before his pupils can ever comprehend or appreciate the theories and divergencies recently arrived at.

I would also ask, is there not a limit to the time the pupil is under tuition? Does he not aim at becoming a surgeon rather than a chemist, physiologist, or botanist, pure and simple?

Can a medical student under these conditions rise to the full height of a specialist in each? Is it expected of him?

I would make no distinction between the medical and veterinary student. Each should have a sufficiency of the collateral sciences, and for myself, I see no just reason why a F.R.C.V.S. should not be entrusted with the examination of a candidate for membership. He certainly would be more alive to the points of contact which exist between the sciences and our own. For example, the variation in physiological phenomena as seen in the different species of animal under our care; the application of chemical truths to the every-day routine of the veterinary surgeon; and of botanical facts, and examples necessitating research into the lines affecting the well-being of our patients, and the botany of agriculture.

Between Agriculture and Veterinary Science the relationship is intimate and of great importance. Our profession as a body is receiving in this direction an increasing amount of recognition and respect, and doubtless as time moves on a much larger field of work and usefulness will open up to us.

I hail with satisfaction the prospect of having in this country a Minister of Agriculture with a seat in the Cabinet, as one unit in our Executive Government.

As sanitary officers, officials attached to municipal bodies, &c., I think that the community would do well to seek more of our aid. The health and well-being of our population is so intimately connected with that of the lower animals and their proper treatment, that the sanitary conditions of milk shops, dairies, shippons, abattoirs, stables, &c., demand such an officer; whilst the contagious disease of animals, the examination of food stuffs for them, and the meat supply of man require not only medical knowledge, but a training in chemistry, and in the use of the microscope such as our members possess; and our profession is amazed that the qualification of a policeman is frequently considered sufficient for such a post.

Now, gentlemen, I turn to a subject replete with interest, and one which opens up wide fields for investigation alike to the veterinarian as to the medical man. I refer to the relationship which exists between the diseases of man and the lower animals; in other words, "pathology" in a strictly comparative sense.

What diseases are communicable from animals to man and *vice versâ*, the modifications exhibited, and the varying results?

A closer study of the diseases of other animals than those which come under our especial purview is also needed to elucidate many of the problems in medical science. Good results have followed the researches of Mr. Bland

Sutton at the Zoological Gardens, London, and much more may be expected from similar investigations. With respect to the diseases common to man and animals, I need scarcely remind you of the noble work done by Pasteur in relation to the Anthracoid diseases and Hydrophobia, but much remains to be done. Not infrequently are there outbreaks of disease amongst our own species which, rightly or otherwise, are attributed to disease in animals.

At the present time great interest centres in the outbreak of Scarlet Fever at Hendon, which by some is held to result from disease in dairy cattle in the neighbourhood.

Dr. Fleming's paper on "The Transmissibility of Diphtheria from Animals to Mankind," read before the Epidermological Society in 1881; Dr. Klein's recent paper on a similar subject, read before the same society; and Professor Crookshank's report on the Hendon outbreak, together with the discussion which has taken place thereon, must impress all of us forcibly that the true study of pathology is not in confining it to one species, but in extending it to many. I will now conclude with a rough quotation from a recent number of the *Lancet* to the effect that "there is room for the energies of a Darwinian investigator who will join together the *disjecta membra* of isolated scientific efforts, and will bring to light the fundamental truths which underlie the numerous bye-laws of medical science. To aid in this work, by providing reliable *data*, the general practitioner should therefore be as highly trained, as judicious, and as sound in theory as he is practically skilful; he should be a scientific observer."

Every veterinary surgeon can at least aspire to the attainment of this condition, and in so working upwards the individual must necessarily help on the body corporate. I conclude, gentlemen, in asking that you will give me your best help in forwarding the interests of this society, which, in other words, is that of the profession at large, or that of the individual in particular.

Proposed by Mr. PETER TAYLOR, seconded by Prof. WILLIAMS, that a hearty vote of thanks be accorded to the President for his excellent address. Carried unanimously.

DINNER.

The members and guests afterwards sat down to dinner, after which

The PRESIDENT proposed the health of the Queen, followed by the health of the Prince and Princess of Wales and the rest of the Royal Family. It is needless to say that both were most heartily received and responded to.

Mr. J. D. BARFORD gave the toast of the "Navy, Army, and Auxiliary Forces." He said that he hoped the day was far distant when Englishmen would fail to acknowledge the distinguished services which the Army, Navy, and Auxiliary Forces had rendered to this country. We had cause for great congratulation that our forces were in such an efficient condition.

Mr. PHILLIPS, Army veterinary surgeon, responded. He thanked the company for the hearty reception of the toast. Individually, he had great confidence in the Navy, Army, and reserve forces, and the country had of late had many opportunities of seeing that the British sailor and soldier were still, as of old, ready to render distinguished services for the honour and welfare of our Queen and country. As regarded the Army Veterinary Department, it was in an unfortunate position. The Indian Government had greatly reduced the number of Army veterinary surgeons required in India, and the consequence was that during the past three years the Department had been closed to candidates. This was, of course, a most serious matter for young members of the profession, and he could not help thinking that it was also very serious for the Department itself. It should, he thought, receive new blood annually. Numerically speaking, the Army Veterinary Department numbered about 125 members, and it was, therefore, weak when compared with the rest of the profession. But although it was weak in comparison, he hoped he

might be allowed to say that he thought it was taking its full share of the work for the advancement and progress of their profession. Encouraged and advised by its present leader, he was sure the Army Veterinary Department had the honour of the profession at heart, and were labouring for its advancement. It was now nearly four years since he had the pleasure of being stationed at Manchester, and being present at the annual meeting of the Lancashire Veterinary Medical Association, and he considered himself fortunate in being again in Manchester and have the honour of receiving once more the invitation to their meeting. He felt that by accepting the invitation, and listening to the discussions that had taken place, he was receiving benefits socially and professionally. He therefore thanked the members for the privilege.

Mr. T. BRIGGS gave the "Victoria University, as represented by Owens College and the Medical Profession." He said that, as an educational body in Manchester, this toast was probably the most important of any on the list. He need hardly say that the Victoria University was one of the universities in the United Kingdom. It had been largely endowed by people who, not to their discredit be it said, had had a somewhat limited education, but who had come forward with the necessary money to carry on the work of the institution. He dared say that probably no institution in this country had been so liberally endowed as Owens College, which was now enlarged into the Victoria University. There were connected with the institution teachers of the highest renown. Manchester had lost one of them in the person of Sir Henry Roscoe, who was known as a distinguished man throughout the whole country. He (Mr. Briggs) was glad to say that he was succeeded in office by a worthy man. He had fortunately had the privilege of attending the Manchester Royal Infirmary and the old Owens College, and so he could speak from personal knowledge of the kind of training and teaching that were to be obtained there. He could say that they had the very best men there, and no doubt they were paid liberally for their services. Therefore, as far as medical teaching and appliances were concerned, everything was as it should be, but what had struck him as a somewhat incongruous matter was that the pathological teaching should be so far from the place where theory was taught. He had the greatest pleasure in giving the toast, and coupling with it the names of Professor Young, Mr. A. W. Stocks, and Dr. Woodcock.

Professor YOUNG, in reply, said the remarks made in proposing the toast were highly complimentary to the medical profession and to the Victoria University. Reference had been jokingly made to the extreme liberality with which the teachers were paid in that institution for their services. He was glad to find that such an impression prevailed, and he only wished the impression was founded on fact. He begged to congratulate the Lancashire Veterinary Medical Association upon initiating what he felt could only result in good to the whole of the profession, which, he thought, might very fairly be said to be represented not only by those whose names were attached to this toast, but to all present at this dinner. Standing up there as he did, he could only say that, as a member of the medical profession, in the restricted sense, he thought he might take upon himself the task, with the utmost freedom and frankness, of acknowledging the valuable assistance, in the pursuit of medical knowledge, which they had received, and were constantly receiving, at the hands of those who had devoted themselves to veterinary work. He could not but think that both the veterinarian and medical man were with each other in one thing, namely, in aiming at a common end, and the members of the medical profession, in the restricted sense, were, he was sure, never wanting, and never failed to acknowledge the great benefits that were to be derived from experimental observation and experimental research in the work of pathology, as well as from the observation of those who happened to

be their patients, whether in the higher or lower animal kingdom. In passing, he might say that he thought the practice of inviting members of kindred associations to the annual gatherings of this Society would result in bringing together more closely both branches of the profession than had hitherto prevailed in Manchester. He felt that the Owens College School of Medicine was not an insignificant department of the Victoria University, and on many occasions it had been indebted to the members of the veterinary profession for their very valuable contributions to the anatomical and pathological museums. He could not help thinking that in a centre of such a magnitude, importance, and power as Manchester was educationally, that veterinarians could band themselves together still more closely by the inauguration of a school of medicine or of surgery, and thus enter into friendly rivalry with the institution at Edinburgh of which Professor Williams was so illustrious a representative. If they could in that way add to the power of Manchester as a medical centre—using the term medical in its broadest sense—he thought they would be doing more to further the interests of the Victoria University than by any other means in their power. He threw out the suggestion, and he hoped that before the next annual meeting of the Lancashire Veterinary Medical Association came round, the nucleus of a new school of veterinary medicine or surgery would have been formed.

Mr. A. W. STOCKS said the study of pathology was one of the first importance, and he was quite convinced, from what he knew of his own knowledge, that it would grow to be a great triumph in Manchester.

Dr. WOODCOCK also responded, and made a very humorous speech.

Mr. T. HOPKIN then proposed "The Veterinary Profession." He said he knew something of the subject of his toast; a little more, perhaps, than the visitors, although not more than many gentlemen seated round that board. The veterinary profession had a life history of something like a century, and he believed that from the time of the first teaching till now it had been unaided except by individual effort. He believed that the teaching of the profession had been the result of individuals establishing schools themselves. They, as a profession, he made bold to say, excelled in one thing, viz., in the practical part. Undoubtedly as practitioners the British veterinarian stood first. He did not say this egotistically; he was speaking what he believed to be strictly true. In the treatment of disease, whether medicinally or surgically, he did not think they had any profession to surpass them; but when one came to the domain of scientific research, the English veterinarian certainly did not stand in the first rank. Their French and German brethren were ahead of them in that respect, and it was easily accounted for. It was due, perhaps, in the national temperament to begin with; and secondly to the facilities afforded in the Continental schools for research. Thanks to the Vivisection Act the English veterinary surgeon had been still further hampered, and he had no opportunities, except under great difficulties, of carrying out any original research or experimental research. But they had a work before them, and by uniting with the sister profession he hoped the time would come when Scarlet Fever, Diphtheria, and many allied diseases should be traced to their source, and equally understood; when the general health of the community would be considerably enhanced, and when the fearful scourges from which we suffered would be banished from the land. He supposed their medical visitors were aware that the Foot-and-Mouth Disease (which very often was spread from end to end of the land) was now entirely absent in this country, which was owing to the active measures taken by the Government to stamp it out. They had almost, although not quite, succeeded in stamping out Pleuro-Pneumonia, and the same might be done with regard to Small-Pox. That was one of the problems to be dealt with, and he hoped that the day was not far distant when it would be dealt with successfully by

the joint professions. He thought he could claim for the veterinary profession the honour of being first in the field in the study of micro-organisms in the animal kingdom. He hoped the time would soon come when they would have every facility for becoming masters of diseases which were now such a fearful scourge to us. He had great pleasure in giving the toast, to which was attached the name of his old teacher, Professor Williams.

Professor WILLIAMS said he was very proud to have the opportunity once more of standing before them as a representative of their own profession. Many years had elapsed since he attended a meeting of this association. He was present he thought at the second annual meeting along with other gentlemen, some of whom had passed away, but others were still living. He then had the great pleasure of becoming acquainted with the President at that time, Mr. Peter Taylor. He was Secretary of the Yorkshire Association, and he was succeeded in that post by their old friend, Mr. William Broughton, who died a few years ago. Upon an occasion of this time they should not forget their old friend, and his many good qualities. Mr. Broughton was for many years prostrated by ill-health, but he did his duty to his profession, which he dearly loved. He was of a very retiring disposition, but at the same time he possessed an amount of good sense and enthusiasm which was found in very few people. By his death the profession suffered a great loss. As time went on he (Professor Williams) went to Edinburgh. At this point he would like to say that taking a retrospective view he thought that the profession had made great progress during the past twenty years, which was a matter for congratulation. He could quite endorse what Mr. Hopkin—an old friend and student in days of trouble and sorrow—said as to the English veterinary surgeon being quite equal to any in the world as far as practical knowledge was concerned. Of course this was a commercial country, and their patients were looked upon from a commercial value point of view. It was very true that in France and Germany a surgeon would now and again perform a brilliant and sensational operation, such for example as taking the navicular bone from the foot of a horse which was kept in pain for months. The animal was then turned out with a club foot. That was regarded as a triumph of veterinary surgery, but in this country a horse with a club foot would be useless, apart from the pain inflicted on the animal in carrying out the operation. On this ground the English veterinary surgeon played second fiddle to his Continental brethren, but as practical men and as physicians the former were far ahead of the latter. Of course in this country there were not the same teachers as those abroad, and the veterinarian here was hampered with the Vivisection Act. Here there were no public endowments or encouragement given to the public schools, all of which, with the exception of that in London, had been founded by individual effort. The English veterinary surgeons could boast of their brilliant men as well as the medical profession, men who were quite fit to be associated with those of the highest scientific attainments. Looking on the Continent, one saw at the present time a veterinarian as President of the Lyons University. That gentleman was not only a veterinarian, but a scientific man of world-wide renown. In other countries a man possessing great scientific attainments was not limited to his own profession, but, as in this case, become President of a University which, in the speaker's opinion, stood upon an equality with the University of Edinburgh. Therefore he took it as a great honour that one of the veterinary profession should be at the head of such an institution. Going to France, there was M. Bouley, President of the French Academy of Science. He also was a veterinarian and a scientific man, and France paid the profession a high compliment in electing him to this high position. In Italy they had had a member of the profession holding a high post under Government. As to this country, the newspapers of that day gave

more names of distinguished members in connection with the Nottingham Show. There was Professor Brown, C.B., an honour which was a compliment to the profession, and all were proud of it. Then there was Sir Henry Simpson, who was knighted because he was President of the Royal College of Veterinary Surgeons. Having obtained these honours, he thought the profession was looking up in this country. He was very sorry that their old friend, the late Professor Robertson, had gone over to the majority without having some distinction conferred upon him. If any man in this world deserved to have some honour given to him for what he had done for the profession, that man was Professor Robertson. He (Professor Williams) knew him for a long time. He stood before Professor Robertson a trembling student, and was examined by him; they were associated for many years in Scotland, and after their friend became Principal of the London College. In a word, he believed that he knew Professor Robertson as well as any man living, and he could truthfully say that he was a shining light in the profession. And now a few words about the establishment of a school in Manchester. The company might depend upon it, the matter had not escaped a great deal of thought. As they were aware, some of them at all events, he established his college at Edinburgh under certain difficulties. His first premises were taken on lease for ten years. Time went on, and this period came to an end, and, as he had made some money, he intended to spend it in building a college, either in an English town or in Edinburgh, whichever he thought would be best. He carefully studied the matter for more than eighteen months. He came to Manchester to his old friend Mr. Thomas Taylor, and discussed the *pros* and *cons* with him. Professor Arthur Gamgee, of Owens College, was in their confidence, and on two occasions he (Prof. Williams) saw at Liverpool a number of the professors of the medical school. The subject was profoundly considered. He had his money to spend, and his future to look to, and he finally came to the conclusion that a school would not succeed in a large commercial town. Therefore he commenced to build the new college at Edinburgh. It would be different if the college was endowed by some noble and generous person or persons leaving, say, £50,000 for that purpose, and provided with a free clinic. It would then succeed. He did not belong to Scotland, and had looked with feelings of some anxiety to return to the South, to be near his native land. He should have been most happy to be stationed in Manchester or Liverpool, but after the deepest thought he found that the thing would not do, and so he gave up the idea. He should rejoice at the establishment of another school, for his opinion was that the more schools there were the greater would be the competition; teaching would approach something like perfection, and men would make themselves really capable on that account. He did not think that for some time to come there would be a veterinary school established in Manchester, unless, indeed, another John Owens—who must, by the way, have been a Welshman like oneself—arose to endow one substantially. In conclusion, he had again to say that he was pleased to attend that meeting.

Mr. S. Locke proposed the health of the President. He said that Mr. Wolstenholme had acted as secretary to this association for some years, and whilst holding that office had endeavoured to make it second to no veterinary medical association in the United Kingdom. The Lancashire Association occupied a high position, and it was no little honour to have been unanimously elected President, as Mr. Wolstenholme had been, for the ensuing year. He had the greatest possible pleasure in asking the company to drink the health of their friend, who, it was to be hoped, would have a successful year.

The President, in responding to the toast, said, whilst he had always been very anxious that the social and ethical element of their society should not

be neglected, he desired that the members should not lose sight of that advance which as a profession it was their duty to make. Unaided as they were, not as they ought to be, they should not only hold their own, but gain a little. They ought in some way or other to ally themselves with their medical *confréres*. That evening their medical friends present at the dinner had not used the term medical as exclusive to themselves. That was a graceful compliment to pay to the veterinary profession, and he believed they meant what they said. He believed himself, if medical science was to advance, as it should advance as near to a definite science as possible, it could not arrive at that goal without the assistance of the veterinary surgeon, or at least till they themselves became surgeons in the widest sense of the word. The many problems which surrounded medical thought were not be elucidated by simply looking for symptoms and results in the human subject. They were not to be cleared up by observing the symptoms which were to be found in our own patients. If they were to get at the basis of sound medical knowledge upon which to build a true science, they must do as Charles Darwin had done, namely, extend their pathological purview to the whole animal creation. The result of the researches of Mr. Bland Sutton at the Zoological Gardens had been that certain truths had been arrived at which had greatly elucidated our clinical and pathological knowledge with respect to the diseases of man. Such researches as these, carefuily carried out and extended to the lower animals, would make plain much that was now in doubt. He sincerely thanked the company for the hearty way they had responded to the toast.

Mr. W. A. TAYLOR, in giving "The Ladies," alluded to the important part ladies were now taking in science and in medicine, and said he thought the day was distant when they would enter into rivalry with the veterinary surgeon.

Dr. HARRIS, of Owens College, responded. He said women were welcomed in the medical profession, for there were in the province of medicine functions which they might perform with very great benefit to the public. He would draw attention to the great improvement that had taken place in the art of nursing during the past fifty years. Thoroughly trained nurses were a great boon to the community and of immense help to the surgeon.

Mr. MOORE also briefly responded.

Mr. ALEXANDER LAWSON proposed "The Visitors."

Mr. JOHN SMITH, of Manchester, in responding to the toast, said that he thought that municipal bodies and others who had the management of civic affairs in their hands, were not at all sufficiently alive to their responsibilities in the matter of the meat supply of the people. Especially were they remiss in not having a qualified veterinary surgeon to see that flesh for human food was free from disease and free from entozoa, such as trichina, echinococcus, or cysticerci.

Mr. R. T. REDMOND also responded.

WEST OF SCOTLAND VETERINARY MEDICAL ASSOCIATION.

THE quarterly meeting was held in the Veterinary College, Glasgow, on 1st February. The office-bearers for the following year were elected: President, Mr. James Weir, F.R.C.V.S, Glasgow; Vice-presidents, Messrs. Houston, Blue, and Peddie; Secretary and Treasurer, Mr. Henry Tweedley, Glasgow.

Mr. A. ROBINSON, Greenock, opened the discussion on Mr. Constable's essay, read at the previous meeting, the subject being "Abortion," by reading a paper on it, which is printed in this month's Journal.

Subsequent remarks were made by Professor MCCALL, Messrs. POTTIE and GARDNER, the chief interest being centred on the contagious nature of the disease when affecting bovine animals.

Mr. POTTIE, Paisley, also introduced the subject of Treatment of Sidebones, as advocated by Mr. Smith in a recent number of the VETERINARY JOURNAL, relating cases in which such treatment was very effectual.

Mr. RUTHERFORD, Edinburgh, also related a very interesting case, where the same method of treatment was followed by excellent results. This terminated an instructive meeting, a very large number of members being present. HENRY TWEEDLEY, *Secretary.*

MIDLAND VETERINARY MEDICAL ASSOCIATION.

THE next quarterly meeting of this Association will be held at 2 p.m. on May 8th, at the Swan Hotel, Stafford, when Mr. Carless will read a paper on "Some of the Pernicious Effects of Sewage on Animal Life."

ROYAL SCOTTISH VETERINARY SOCIETY.

THE first quarterly meeting of this Society was held in the Library of the Dick Veterinary College, Edinburgh, on Wednesday, March 21st.

The President, Professor Walley, occupied the chair, and the following members were present:—Messrs. A. Baird and M'Arthur, Edinburgh; Burnett, Maybole; Barclay, Dunfermline; Weir, Glasgow; M'Geoch, Paisley; Fingzies, Lochgelly; Cassells, Lanark; Pow, Jedburgh; H. Hunter and W. Hunter, Newcastle-on-Tyne; R. Reid, Auchtermuchty; Fairbairn, Cupar Fife; Young, Leith; and Professors Baird and M Fadyean. Dr. A. P. Aitken and Messrs. Scoular, Moore, Mullen, Gold, Clayton, and R. Walley were present as visitors.

Mr. A. BAIRD, *interim* Secretary, intimated that over forty ordinary members had already joined the Society. The following gentlemen were elected Vice-Presidents for the current year:—Professor Baird, Dick Veterinary College; Mr. Burnett, Maybole; and Mr. Reid, sen., Auchtermuchty. Mr. Fairbairn, Cupar Fife, was elected Secretary and Treasurer.

The following gentlemen were elected honorary members of the Society:—Professors Turner, Chiene, Balfour, and Greenfield, Edinburgh University; Professor M'Kendrick, Glasgow University; Drs. Woodhead, Symington, Macfarlane, Aitken, James, Bruce, Cathcart, G. W. Balfour, Littlejohn, and Russell.

The rules for the conduct of the Society were discussed and adopted.

The CHAIRMAN, in intimating his acceptance of the office of President, remarked that he need not say much with reference to the establishment of the new Society. Most of them, he imagined, regretted some of the things that had passed, or that led up to the present movement. So far as he was personally concerned, he only regretted that because it did away to some extent with the unity which should exist in the ranks of a small body like theirs. He was not conscious of having done anything to bring about the dissolution of the Society. He could not, in looking over the past, charge himself with anything that could be considered ungentlemanly or unkind towards the old Association; and the minutes showed that, since joining the Association in 1872, he had held the office of President twice, and had twice been appointed Vice-President, and that he might claim to have done a very fair share of the work of the Society. He hoped he might be spared to remain a member of the new Society as long as he had been a member of the old; and that the same might be said of him that was said only two years ago, that he had done very much to popularise the old Society. In establishing the new Society they must avoid introducing any personal element, and they must make it as entirely a scientific Society as they could. In such a Society all but purely scientific subjects should be eschewed. Political and social subjects might very well be considered outside of the Society.

The PRESIDENT exhibited a series of interesting morbid specimens.

It was, he said, a remarkable fact that during the last six months the particulars of three cases of death by internal hæmorrhage, resulting from Renal Disease, had been brought under his notice.

In the first case, occurring in the practice of Mr. Pender, of Lockerbie, the kidneys were the seat of interstitial inflammation; and in addition there was inflammation and thrombosis of one of the iliac arteries, and the coat of the latter had suddenly given way, it was supposed, from an injury received during an attack of Colic.

The second case occurred in a horse belonging to Messrs. Withers and Co., London. He was taken ill on the morning of Monday, November 21st, with symptoms of internal hæmorrhage, and showed evidence of pain on the left side. He died on the afternoon of the following day. The *post-mortem* was made by Mr. W. Reekie, who found the left kidney enormously enlarged and softened, its capsule ruptured, and an immense quantity of blood in the abdomen. The kidney was forwarded to Professor Walley by Mr. Reekie, and a calculus, which the Professor exhibited, was found embedded in the kidney structure. This had been the cause of acute inflammation and subsequent degeneration of kidney. The interesting point in connection with this case was that the horse had been in the possession of Messrs. Withers and Co. for four years, during which time it had never shown the slightest signs of illness.

The third case came under the observation of Mr. William Barling, of Newnham, whose attention was first directed to it at five o'clock on Monday evening, February 6th. Mr. Barling found the horse in a very bad state, and had him removed to his own place, a distance of a few yards from the stable; the symptoms shown were those of flatulence, with stiffness of the hind legs. The horse died in about an hour and a half, and on *post-mortem* examination a large quantity of blood was found in its abdomen. Examination of the kidneys revealed a beautiful example of Cystic Disease, as a result of Hydronephrosis, produced by constriction of the ureters. The right kidney was reduced to a mere cyst, the left much enlarged; but the cystic change had only destroyed the half of its medullary portion.

The Bladder of a Horse, forwarded by Mr. B. Kettle, of Market Drayton. The specimen was a good example of sabulous bladder. It weighed 14 lbs., and its wall was much thickened from chronic inflammation. This was the first of its kind that had come under the observation of Mr. Kettle during a practice extending over forty-eight years. The horse, a well-bred chestnut, had been ill for two years, but had been very much neglected by his owner, and was ultimately killed on account of having fractured his leg.

The Penis of a Bullock, showing the effects of obliteration of the lumen of the urethra by calcareous matter, with subsequent croupous inflammation of the urethral wall, and accumulation of an enormous mass of calcareous deposit. The penis was removed by Mr. Colin Campbell, of Methwold Hythe, by an incision extending from the scrotum forward through the prepuce. In performing the operation, Mr. Campbell, finding that the stump of the penis retracted a considerable distance, and being apprehensive that the urethra might become constricted, made a second incision a little distance below the perineum, through which he drew the stump, securing it in the wound by means of sutures. The urethra was subsequently kept open by inserting a small catheter, which was kept *in situ* by the aid of catgut sutures. The bullock ultimately did well.

A Cystic Calculus, removed from the urethra by Mr. Blair, of Duns. In this case, the horse which was ten or twelve years old, had suffered from repeated attacks of apparent Colic.

Section of Adductor Muscles of the Thigh of a Jersey Cow, showing evidence

of the effects of severe injury received during attempts to rise on recovery from parturient Apoplexy. This case occurred in the practice of Messrs. H. and A. Hunter, of Newcastle-on-Tyne, and it illustrated a lesion of comparatively common occurrence in cows, as a result of injuries received during or after parturition. The animal, on recovery from the brain symptoms, was unable to support herself on her hind legs, which became spread out in a lateral direction. The muscle had a parboiled appearance, was very soft, and in parts a large quantity of new cicatrical tissue existed.

Section of the Body of the Uterus of a Cow, presenting the changes usually seen in cases of chronic Twist of that organ. The lumen of the uterus was nearly obliterated by the formation of an enormous quantity of new interstitial tissue, as a result of mechanical venous congestion; the large veins were obliterated by thrombi. The case occurred in the practice of Mr. R. Levie, of Lerwick, and illustrated a fact which Professor Walley had brought under the notice of the profession as far back as 1872 or 1873—viz., that in old cases of this kind turning of the body for the purpose of reducing the Twist was useless, as, although the organ might by this means be restored to its normal position, it would be impossible to remove the fœtus, on account of the obliteration of the canal.

A Specimen of Intussusception of the Small Bowels of a Cow, sent by Mr. W. D. Fairbairn, of Cupar, on the 27th ult. The cow was eight years old, and during a period of six days had only once defœcated, the ejected matter being of the colour and consistence of coal tar, and composed of altered blood clot. During the existence of the illness the animal evinced very few signs of abdominal pain. Professor Walley remarked that this was the first case of Intussusception that had come under his observation in an adult bovine, and that cattle did not, as a rule, show such marked evidence of pain in intestinal disease as horses.

Section of Lung from Bullock, and also of the Muscles and Connective Tissue around the Trachea at the Base of the Neck, showing, in the case of the lung, the changes of contagious Pleuro-pneumonia of several months' standing, with extension of the specific lesion along the mediastinal tissue. During life the neck was enormously swollen, and Professor Walley remarked that this was the worst case of the kind he had met with, although, doubtless, many of the cases of supposed Dropsy, with which the older members were all familiar in days gone by, were of this nature. The lesion was identical with that resulting from inoculation.

Professor M'FADYEAN said that he had been much interested in one of the specimens exhibited by the Chairman, showing in a case of spontaneous Pleuro-pneumonia specific lesions in the neck. He thought that this might have been excited by a bruise or injury; that it was, in fact, similar in its nature and causation to the swellings which were not uncommonly seen in cattle inoculated in the tail for Pleuro-pneumonia. Professor Walley, however, as a result of his examination, concluded that the neck lesion had formed by direct extension from the affected lung. Still, he thought it was a point worthy of inquiry, whether, even in the subjects of spontaneous Pleuro-pneumonia, such a lesion might not form on any part of the body as the result of a bruise. If such were the case it might be employed as an aid to diagnosis in doubtful cases of Pleuro-pneumonia and Tubercle.

VETERINARY MEDICAL SANITATION.

The CHAIRMAN read a paper on "Veterinary Medical Sanitation," in the course of which he expressed satisfaction that the Privy Council had determined to adopt energetic measures for the extermination of Pleuro-pneumonia, but he confessed to a feeling of disappointment on several points of detail. He maintained that the slaughter of contaminated as well as of diseased animals,

for which he had been advocating for years, had been shown by the experience of other nations to be the only reliable method of dealing with the Plague if it were to be effectually suppressed. Surely in a matter of that kind, which affected the prosperity of every individual in the State, the burden should be borne by all. Why had it been a local burden? Simply because the Privy Council had not the power to make it an Imperial burden. The sooner Parliament gave the Privy Council that power the better. It was plainly an injustice to saddle any community with the cost of suppressing an outbreak of disease, with the inception or introduction of which that community had had nothing to do. Why, he asked, should the taxpayers of Edinburgh be burdened with a great outlay for the purpose of suppressing an outbreak of Pleuro-pneumonia when neither the authorities nor the owners of the animals could be in any way held responsible for the introduction of the malady? Another grave defect in the new order was the manner in which the inspection was to be carried out. He failed to see why the Privy Council had not taken the matter into its own hands as was done in dealing with the Cattle Plague. He felt justified in saying that that defect, coupled with the one before mentioned, would do much towards counteracting the beneficial work of the order. Principal Walley then pointed out that the Danish Government had during the last seventeen years suppressed six or seven outbreaks of the disease not only by prompt slaughter of the diseased animals, but also by the slaughter or isolation of all animals within a tolerably extensive radius of the infected place. Tuberculosis, however, was the disease *par excellence* which at the present day demanded, from a sanitary point of view, the most earnest and full consideration. The terrible increase of this disease amongst bovines was simply appalling, and it was no exaggeration to say that the number of cases which came under observation exceeded by 20 to 30 per cent. those met with about two years ago. Not only stock, but the milk producers and the flesh producers of the country, were found to be subject to the disease, and that, too, in many cases where during life the animals appeared to be in perfect health. The sanitary aspect of the question was an exceedingly grave one in the face of the fact that cows affected with the disease frequently gave a very large yield of milk. It was also a fact that lesions were in many cases localised in the udder of the cow. The infective nature of the milk had been proved by countless experiments carried out in very different species of animals, and there was an amount of individual evidence tending to show that these infective qualities were transmitted to man. Since he had been interested in the question he had always held that milk never became harmful unless the udder was affected. Other observers had held that that was not necessary in order to render the milk infective. The strongest advocate of that view, Professor Bong, of Copenhagen, had written to him (Principal Walley) stating that he had come to the conclusion that the milk of tuberculous cows, in which there were no lesions in the mammary glands, only exceptionally contained contagion. Another question of equal importance is the origin or transmissibility of such diseases as Scarlet Fever and Diphtheria from animals to men. The "Scarlet Fever craze" had been in existence for several years, and some very remarkable hypotheses had been propounded by medical men who had, he thought, based their conclusions upon very insufficient data. Assuming the transmissibility of Scarlet Fever from man to animals, and *vice-versâ*, and assuming the existence of that affection independently in animals, such transmissibility or such independent existence of the disease had never come under observation. He expressed the opinion that none of the eruptive diseases between which and Scarlet Fever a resemblance had been traced, were in any way related to the disease; and, further, the Scarlet Fever of the human being had not been, nor could it be, transmitted to cows.

In the discussion which followed, Mr. WEIR, Glasgow, alluded to the grow-

ing importance of Tuberculosis among dairy stock. In his experience it was very common among cows bought in to replenish city byres, and it was a matter of common observation that the disease in these animals seemed to be in a measure arrested during pregnancy, to proceed, however, with greater rapidity after parturition. Referring to the danger to human beings from the consumption of milk from tuberculous cows, he narrated a case in which there was some reason to believe that an infant had in this manner become infected.

Mr. M'GEOCH, Paisley, said that he had himself proved by experiment in certain cases the infective properties of milk from tuberculous cows. He was of opinion that such milk was not free from danger even in cases where there was no discoverable lesion of the mammary gland.

Professor M'FADYEAN then brought under the notice of the Society the particulars of two cases of Tuberculosis, and one of Actinomycosis in the horse.

The members and friends afterwards dined together in the new Practical Chemistry Class-room. During the course of the proceedings Mr. H. Hunter, Newcastle-on-Tyne, on behalf of over two hundred members of the veterinary profession, presented to Professor Walley a beautifully illuminated and bound address. The address set forth that the signatories desired to convey to Principal Walley an expression of the esteem in which they held him, recognising as they did his devoted attachment to their profession and his unwearied exertions for its advancement. They considered that the completion of the new and handsome college buildings, for which he had worked so assiduously and so successfully, was a fitting time to wish him and the institution over which he presided continued prosperity. Professor Walley suitably acknowledged the presentation, and the proceedings shortly afterwards terminated.

W. D. FAIRBAIRN, *Hon. Sec.*

MIDLAND COUNTIES VETERINARY MEDICAL ASSOCIATION.

THE annual meeting of this Association was held on the 18th February, at the Great Western Hotel, Birmingham.

Present: Mr. J. M. Parker, President, in the chair; Messrs. Over and Malcolm, Vice-Presidents; Mr. T. Chambers, Secretary; Messrs. Beddard and Pritchard, Wolverhampton; Blakeway, Stanley, Price, and Tailby, Birmingham; Barling, Ross; Carless, Stafford; Collett and Dawes, West Bromwich; Trees, Uppingham; Jones, Leicester; Olver, Tamworth; Reynolds, Daventry; Smith, Tunstall; Trigger, Newcastle-under-Lyme; and Taylor, Stourbridge.

Visitors: Mr. J. Briggs, J.P., F.R.C.V.S., Bury; Mr. J. Hopkins, F.R.C.V.S., Manchester; Mr. W. A. Taylor, F.R.C.V.S., Manchester; Mr. Irving, M.R.C.V.S., Birmingham; Mr. Councillor Lawley Parker, J.P., Birmingham; Mr. H. G. Bambridge, Solihull; Mr. D. L. Carey-Rewis, co. Clare; and Mr. J. H. Joyce, King's Heath.

The minutes of last meeting were read and adopted.

The HON. SECRETARY read letters of apology from Sir Henry Simpson, Windsor; Professors Walley and Williams, Edinburgh; Messrs. Gooch, Stamford; Golden, Rugeley; Cartwright, Wolverhampton; Merrick, Northampton; and Blakeway, the Treasurer, who was absent through illness.

Election of Officers.

The PRESIDENT proposed Mr. Trigger as President for next year; he felt sure no one would fill the office better. (Applause.)

Mr. OLVER seconded, and Mr. CHAMBERS supported the proposition. Carried unanimously.

The PRESIDENT proposed that Mr. Malcolm be elected Secretary.

This was seconded by Mr. OVER. Carried unanimously.

The PRESIDENT next moved the election of Mr. Blakeway as Treasurer. Mr. Blakeway was a gentleman who had worked hard for the Association, and no one could take better care of their money than he did.

Mr. PRITCHARD seconded this, and it was carried unanimously.

Mr. PRICE moved, and Mr. STANLEY seconded, a resolution that Messrs. Chambers and Tailby be elected Vice-Presidents. Carried unanimously.

Mr. TRIGGER thanked the Association for the honour they had done him. It was an honour quite unexpected; but, since they had deemed him worthy of it, he would endeavour to uphold the dignity of the Association during his term of office. He was glad Mr. Malcolm was to be his Hon. Secretary.

Mr. MALCOLM, in response to his election, thanked the members for electing him Secretary. He knew it meant work, but he had done secretarial work before, and gained many friends thereby; therefore he had pleasure in accepting the position.

Mr. CHAMBERS and Mr. TAILBY returned thanks for their election as Vice-Presidents.

Mr. BLAKEWAY acknowledged the re-election of his father as Treasurer.

The PRESIDENT then handed in the balance-sheet, audited by himself and Mr. Trigger, and found correct, showing a balance in favour of the Society of £117 17s. After payment of a second donation of £50 to the Royal College building fund,

On the motion of the PRESIDENT, the accounts were passed.

The SECRETARY then read a letter from the Secretary of the R.C.V.S., thanking the Midland Society for their donation.

A discussion then took place as to the nomination of a member as a candidate for Council, in which the PRESIDENT, Messrs. OLVER, TRIGGER, PRITCHARD, and others took part.

It was ultimately decided not to nominate a candidate this year, and the hope was expressed that the Society would as usual support the nominees of the Yorkshire and Lancashire Associations.

The Secretary was authorised to co-operate with these Associations with the view of securing the return of the gentlemen selected by them.

Mr. TRIGGER proposed a vote of thanks to the retiring officers for their services during the past year. They had carried on the Association with such success, and discharged the duties with so much satisfaction, that it would be difficult to follow them.

The PRESIDENT and SECRETARY briefly responded, and Mr. BLAKEWAY replied for his father.

The PRESIDENT then called upon Mr. MALCOLM to read his paper on "The Feeding of Draught Horses," which was as follows:—

MR. PRESIDENT AND GENTLEMEN,—When requested to read a paper before this meeting it was with some diffidence that I ventured to comply; for, remembering the many able addresses we have had from learned professors and others holding high position in the profession, it was only after feeling assured of your leniency that I agreed to bring this one before you. Many may probably think that as we have only three or at most four meetings a year, such a commonplace, every-day subject as the feeding of draught horses should not have been chosen; but instead, some topic introduced which would have possibly excited a more animated and interesting discussion than may be possible on a paper on horse feeding. At the same time I do not deem any apology for the subject necessary. It is one of great importance to most of us, both from a utilitarian and economical point of view; and besides this, I am acting under the express wishes of our President. Willing as I have no doubt we all are to obey the behests of our chief, especially when he

does us the honour of requesting a paper for one of our meetings, my acquiescence was all the more readily given in the present case as I hope to acquire new information from the discussion which I trust will follow, and so add to my knowledge of this highly important subject.

It will not be possible to bring before you much that is entirely new or original, as I have to a large extent followed in the footsteps of my able preceptor, Mr. Hunting, of South Hetton, with whose published views on the question many of you are no doubt familiar.

Relation between the Constituents of Animals and Vegetables.

As the food of horses consists wholly of vegetable matters, a brief comparative glance may be taken of the component constituents of animals and vegetables before entering upon the discussion of foods and feeding.

The constituents composing the animal body are divisible into two groups, the inorganic or incombustible, represented by the saline materials or ash; and the organic or combustible, which are again sub-divisible into nitrogenous substances represented by albumenoids and non-nitrogenous bodies, such as fat.

Vegetable substances are also composed of organic and inorganic constituents, the latter being represented by the ash, and the former by albumenoid and fatty matters; but while the essential constituents of animals and vegetables are similar, they differ in their relative proportions. Thus the comparative amount of fatty matters present in vegetables, and principally represented by carbo-hydrates, such as starch, sugar, and gum, is much greater in proportion to nitrogenous matters than is the case with animal bodies. The use of this excess of fatty matters in vegetables will be apparent when it is remembered that besides supplying materials for building up the animal frame and replacing tissue waste, food provides combustible matters for the generation and maintenance of heat, and for the production of mechanical force. In brief, the constituents of food are nitrogenous matters, fats, carbo-hydrates, and ash; and, like the animal body, food usually contains in addition a considerable proportion of water.

Of these constituents the vegetable nitrogenous matters, such as gluten, legumin, etc., are similar in composition to, and usually go to form the animal nitrogenous matters, as albumen, fibrine, casein; they also furnish materials for the gelatinoids. By their combustion heat and force are developed, but if only partial oxidation takes place fat may be produced. Albumenoids, therefore, can supply most of the animal requirements, a statement which cannot be made of any other food constituent. Fatty matters, whether true fats or carbo-hydrates, are the chief sources of heat and force, but when given in excess are stored up in the form of fat in the animal body. The saline materials present in the food provide the necessary ash constituents for bone and other tissue, and while a sufficient supply of the requisite ash is of much importance in the food of pregnant animals and growing stock, it is of much less account in that of mature dray horses. In consequence of the limited amount of ash necessary for fully-developed animals it may practically be eliminated from consideration, the small quantity required to replace waste being amply provided for in most ordinary foods. The water required by horses for nutritive and depurative purposes is obtained partly from the food, but principally from the drinking water.

The Process of Digestion.

These food constituents, before being available for nourishing the animal body, have to undergo a process of digestion. This is commenced in the mouth, where the food is ground up and masticated. Some of its carbo-hydrates, such as sugar, are soluble and diffusible, and require no digestion.

Others, such as starch and cellulose, are insoluble. These latter are here acted upon by the saliva, whose special action is the conversion of insoluble starch into soluble sugar. Any starch unconverted in the mouth passes through the stomach without material change, its further digestion being completed in the small intestines, where the solution of starch and cellulose is effected by the action of the pancreatic and intestinal secretions.

True fats are liquified by the heat of the body, but their digestion is not effected until they reach the small intestines, where they are emulsified and saponified through the agency of the bile and pancreatic and intestinal secretions.

The digestion of albumenoids is mainly effected in the stomach, where they are acted upon by the gastric juice, whose function is to convert the indiffusible proteids or albumenoids into diffusible peptones. Those not converted by the acid gastric juice in the stomach, on reaching the small intestines are subjected to the action of the alkaline pancreatic juice, one of whose functions is the conversion of albumenoids into peptones.

The saline constituents, if not previously in solution, are, on arrival at the stomach, immediately dissolved.

Water requires no digestion, but is the medium by which the solution of the other food materials is effected.

The constituents of the food thus digested undergo absorption in a greater or less degree throughout the whole alimentary canal, but chiefly in the small intestines, from whence the digested materials pass either directly into the blood or enter it through the intermediate lacteals and lymphatics. In the blood they are carried to the various tissues, where they either serve nutritive purposes; or, by their combustion with the inhaled oxygen from the atmosphere, produce heat and force.

The products of combustion and tissue waste are ultimately carried off through one or other of the excretory channels. The function of food is to provide for this tissue waste and combustion. But, however completely digestion of the food takes place, a certain percentage of it either cannot be, or at any rate remains undigested, and is ejected as excrement.

Food Stuffs: Their Composition.

The following table, compiled from an average of many, shows the approximate composition of the various stuffs given as horse provender:—

Articles of Food.	Water.	Albumenoids.	Fats.	Soluble Carbohydrates.	Fibre.	Salts.
Beans	14.5	25.5	1.8	45.8	9.3	3.1
Peas	14.3	22.4	2.0	50.7	7.9	2.5
Oats	13.9	12.3	5.6	53.8	10.8	3.6
Barley	14.0	10.0	2.2	64.2	7.0	2.6
Maize	12.0	10.0	5.3	68.0	3.0	1.7
Bran	13.5	14.0	4.0	49.1	14.2	5.4
Linseed ...	12.0	21.5	38.0	17.0	7.5	4.0
Clover Hay ...	16.5	13.0	2.8	35.4	26.5	5.8
Meadow Hay ...	14.6	10.0	2.4	41.0	26.6	6.4
Clover	83.0	3.0	0.7	7.3	4.5	1.5
Grass	76.5	3.1	0.8	13.0	5.6	2.0

You are no doubt all more or less familiar with similar tables, and the leading characteristics of the various foods; nevertheless, permit me to recall the following important facts:—

1st. That the leguminous seeds contain twice as much albumenoids as the cereals.

2nd. That the special feature of the cereals is the large percentage of easily-digested carbo-hydrates.

3rd. That maize is extremely deficient in ash constituents.

Interesting and highly-instructive as such tables are, they may be very misleading if studied without discrimination. Although practically accurate in the relative estimate they present of the feeding value of kindred substances, they cannot be relied upon in calculating the approximate value of such different substances as oats and hay, for it will be at once apparent to all practical men that hay has not relatively such a high feeding value as here given. Again, bran appears to have as much nutriment as oats, but no one who knows anything about the matter practically would expect the same work from a horse fed on bran as from the same horse fed on oats. But while it is fallacious to compare oats and bran by such tables, we may safely rely upon the accuracy of the approximate values shown to exist between the various grains, or between meadow grass and green clover; or, again, between meadow hay and clover hay. Let us endeavour to account for this apparent anomaly in these tables. It has been the custom to reckon the whole of the nitrogen present in the foods as albumenoid. Now, while this is fairly accurate for the seeds, it is not so with other foods, as a quantity of the nitrogenous matter in bran, for example, has been found to be either indigestible, or, if digestible, non-albumenoid consequently acting simply as a fat-former. Again, when we come to consider the digestibility of foods, it will be seen that only the half of the organic matter in hay is digested, against 80 to 90 per cent. in corn.

Nutritive or Albumenoid Ratio of Foods.

In calculating the nutritive value of foods, a very important factor is the nutritive or albumenoid ratio—in other words, the proportion which exists between its flesh-formers and fat-formers. To calculate this, it is usual to multiply the fat present by 2·44, so as to obtain the equivalent in starch, and then add the product thus obtained to the carbo-hydrates. The relation of flesh-formers to fat-formers reckoned as carbo-hydrates is then easily obtained. Thus—

Beans in the above table show an albumenoid ratio of					1 to 2·3
Oats	„	„	„	„	1 to 6·4
Maize	„	„	„	„	1 to 8·3

The tables may also be made to demonstrate that a mixture of 100 lbs. of beans and 400 lbs. of maize contains quite as many lbs. of both fat-formers and flesh-formers as 500 lbs. of oats, and at the same time the albumenoid ratio of the former is fully equal to that of the latter. Thus:—

	Albumenoids.		Carbo-hydrates and fat reckoned as Starch.	
100 lbs. Beans contain ...	25·5 lbs.	and	59·49 lbs.	
400 lbs. Maize „ ...	40·0 lbs.	„	335·72 lbs.	
Making a total of ...	65·5 lbs.	„	395·21 lbs.	= 1 to 6·0 ratio:
While:—				
500 lbs. Oats contain ...	61·5 lbs.	„	391·32 lbs.	= 1 to 6·4

(*To be continued.*)

MONTREAL VETERINARY COLLEGE.

THE twenty-second session of the Montreal Veterinary College closed on March 28th, when the prizes won at the examinations were distributed. The chair was occupied by Mr. S. N. Blackwood, J.P., member of the Board of

Agriculture, and amongst others present were G. Leclerc, Secretary to the Board of Agriculture, J. W. Gadsden, M.R.C.V.S., Philadelphia; W. Bryden, V.S., Boston; J. Crawford, J. Kimball, and many of the relatives of the students.

The CHAIRMAN, on rising to present the prizes, said that the examinations this year showed that the students possessed a better knowledge of their profession than in previous years, and hoped those who were leaving the college would continue to uphold the honour of their Alma Mater. He had taken a good deal of interest to find out how the past graduates had progressed, and has discovered that fourteen of them averaged an annual income of 6,000 dols. a year. There was no reason, seeing that this country was yet in its infancy, that those present, if they only put their heart into the branch of study they had chosen, should not attain even to greater results.

Dr. J. W. GADSDEN, of Philadelphia, one of the examiners, being called upon to say a few words, replied that he was astonished at the way in which questions had been answered; they were given deliberately and fairly, especially concerning the two contagious diseases, Tuberculosis and Pleuro-pneumonia, two subjects they had never seen in this country, and this only proved that they had received a very high standard of training from their Principal, Dr. McEachran, whose great talents in the profession were known all over the American continent. They could not have attained this had they gone through the usual routine enacted by most colleges, which only held two terms before deciding whether a candidate was fit or not. The course laid down by this college of three terms was the best and proper one. It gave the student time to gain practical as well as theoretical knowledge. The one without the other was useless, and must prove to the aspirant who went out into the world to fight for his living a disastrous failure in the end. With regard to the incomes made by past students, they ought to thank their stars they were in Canada; no such incomes could be made in Philadelphia. He hoped to come to Canada to many more of their examinations, so hospitably had he been treated by their Principal, Dr. McEachran, and other gentlemen in this beautiful city.

Mr. W. BRYDEN, V.S., Boston, also spoke a few words of encouragement to the students. As one of its old pupils, he could bear high testimony to the training received in it.

Dr. MILLS hoped that they would not forget their Alma Mater. It was due to the college itself that no matter in what part of the world they located they should correspond with them. It gave a stimulus to future students to try and be as successful as those who had gone before. He wished them long life and prosperity.

The Chairman then distributed the prizes as follows:—

The Prize-winners.

Best General Examination—Silver medal, the gift of the Council of Agriculture, to the student who obtains the highest percentage of marks on all the subjects for his two last years of study, awarded to H. R. Macaulay.

Practice of Medicine and Surgery (senior class)—1st prize, George C. Becket; 2nd prize, James B. Paige; honourable mention, H. R. Macaulay.

Veterinary Anatomy—1st. prize, H. R. Macaulay; 2nd prize, J. B. Paige; honourable mention, John Robertson.

Cattle Pathology—1st prize, J. B. Paige; 2nd prize, H. R. Macaulay; honourable mention, — McGarth.

Chemistry—1st prize, Robert Darling; 2nd prize, J. H. Roberts.

Physiology—1st prize, H. R. Macaulay; 2nd prize, J. M. Parker.

Materia Medica—1st prize, G. A. Wieland; 2nd prize, J. G. Harris.

Pathological Anatomy (presented by Dr. Johnston for proficiency in microscopic work and autopsy)—H. R. Macaulay.

Junior Class.

Practice of Medicine and Surgery—1st prize, J. G. Harris.

Presentation of Diplomas.

The CHAIRMAN then called upon Principal McEachran to present the Diplomas of the Association.

The PRINCIPAL, in a short but pithy speech, exhorted them not to lay aside studies after they had left the college, but to continue them, and try and raise themselves to as high a standard as they could possibly reach, and they would find that their efforts would be crowned with success. He then presented the following students who had fulfilled the requirements of the curriculum and obtained the necessary percentage of marks in their written examinations, presented themselves and successfully passed, viz. :—Messrs. Becket, Craig, Dawes, Macaulay, McGarth, Miller, Munro, Murphy, Paige, Roberts, Robertson, and Smith.

A vote of thanks was then passed to the Chairman, after which the session closed.

ROYAL AGRICULTURAL SOCIETY.

AT the monthly Council Meeting on April 11th, Sir John Thorold (chairman) reported that copies of the Pleuro-pneumonia Slaughter Order for 1888 had been laid before the Committee, and they were of opinion that this Order met the views expressed by the Council, but that it was too soon to give an opinion as to its effect. Professor Brown had stated that, in order to carry out the view of the Society as regards the teaching of cattle pathology at the Royal Veterinary College, it was desirable that members of the Society should send to the College any diseased animals (cattle, sheep, or swine), which they would otherwise destroy as useless, and also any specimens of diseased parts of an unusual character. The express transit would be defrayed by the College, and, in the event of living animals being sent, it would be necessary to telegraph to the Royal Veterinary College, Camden Town, the time of their arrival at a London station, so that a van might be sent to meet them.

Professor BROWN had also presented the following report :—

Pleuro-pneumonia.—According to the returns published in the *London Gazette*, it appears that this disease continues to be more prevalent in Scotland than in England. During the past quarter the fresh outbreaks reported in Great Britain amounted to 147, of which sixty were in England and eighty-seven in Scotland, while the total cattle attacked numbered 605, of which 245 were in England, and the remaining 360 in Scotland. These figures show a decrease as compared with those for the corresponding period of 1887, when the outbreaks in England were sixty-five, and the number of cattle attacked was 291, and in Scotland the outbreaks then amounted to 112, and the cattle attacked to 516.

In England during the present year the disease has been most prevalent in the counties of Kent and Lancaster, while in Scotland it has been most prevalent in Aberdeenshire, where there have been fewer than forty-four outbreaks, most of them directly traceable to the purchase of fresh stock at public sales, a considerable proportion of which were no doubt previously infected.

Swine Fever.—The outbreaks of this disease reported in Great Britain during the thirteen weeks ending March 31st amounted to 1,025, and the swine attacked to 5,838. Of these 3,151 were killed, 2,153 died, and 495 recovered. This compares favourably with the returns for the first quarter of 1887, when there were 1,223 fresh outbreaks, and 6,907 swine attacked. The Swine Fever returns for the past three or four years show that towards

the end of the first quarter of the year a gradual increase of this disease usually begins and continues through the second and third quarters, but up to the present this annual extension of the disease has not taken place this year.

Anthrax.—The number of outbreaks of this disease reported in Great Britain during the quarter ended 31st March has been fifty-seven, and the number of animals attacked 164. Of these 104 died, and forty-four are reported as having recovered.

Lord EGERTON of Tatton, referring to the inquiries which, as stated at the last meeting of Council, he had addressed to the Home Secretary on the subject of the inoculations for Quarter-ill practised upon his herd by Professor Penberthy, said he had received, on March 8th, a reply from the Home Office in the following terms:—

The distinction has hitherto been drawn and upheld in dealing with inoculations, and the application of the Cruelty to Animals Act, 1876, that if the inoculations are performed with a *bonâ fide* belief in their efficacy, in order to produce a practical result—viz., the prevention of disease in a particular case—they constitute simple veterinary operations, but if performed with a view to test or verify a theory, they constitute experiments under the Act for the legal performance of which a licence is necessary.

This answer had been submitted by his (Lord Egerton's) request to Professor Brown, who had kindly drawn up the following memorandum on the subject:—

In the reply of the Secretary of State to the inquiry submitted by Lord Egerton of Tatton, it is stated in effect that inoculations do not come within the provisions of the Cruelty to Animals Act of 1876, if the operator is in a particular mental state—viz., if he has faith in the efficacy of the operation.

In reference to this definition, it could easily be proved that a large number of operations connected with the medical and surgical treatment of the lower animals would properly come under the provisions of the Cruelty to Animals Act of 1876—for instance, the injection of new remedies under the skin (hypodermically), the operation of firing, rowelling, blistering, and setoning which are frequently performed without any *bonâ fide* belief in their efficacy, but rather for the purpose of testing their curative or preventive value. A stock owner may, for example, send for a veterinary surgeon and request him to put setons in the dewlaps of his calves, and the operation in performed, although the operator may not have any belief that benefit will arise therefrom. The same remark applies in many cases where a horse's legs are fired or blistered by direction of the owner, and frequently in opposition to the views of the operator. Indeed, it appears that according to a strict reading of the Cruelty to Animals Act of 1876, persons performing operations on the lower animals are liable to be summoned, and made to prove that they had a *bonâ fide* belief in any operation in which they may have performed. In order to avoid this danger an operator would have to commit the manifest absurdity of examining himself as to his faith in the efficacy of an operation before he undertook to perform it.

It is quite evident that unless veterinary science is to remain in a stagnant position something must be done to remedy this anomalous state of affairs.

(Signed) G. T. BROWN.

March 22nd, 1888.

He (Lord Egerton) would like to ask Professor Brown what were the alterations of the law capable of being drafted in a bill which the veterinary profession desired to enable them to carry out experiments on the farm outside their laboratories or operating rooms, for remedying diseases of animals on the farm.

Professor BROWN stated that it was really the case that unless an operator

believed in what he was about to do, he could not legally perform an operation. He contended that according to a common-sense interpretation of the Act, there are hundreds of cases in which veterinary surgeons performed operations without anything like an approach to a *bonâ fide* belief within the meaning of the Act. He suggested that the Society should take the matter up, and ask the Government to introduce a short Bill exempting veterinary surgeons from the provisions of the Cruelty to Animals Act where there was a *bonâ fide* intention of doing good to the animals and preventing suffering. No one, not even the most sensitive humanitarian, could object to this.

After some further discussion, it was decided that the Council should invite the authorities of the Royal Veterinary College to join with them in approaching the Government, with a view to the introduction of a Bill on the subject.

Army Veterinary Department.

Veterinary Surgeon Richardson has arrived in England on six months' sick leave, and Veterinary Surgeon Bradell on six months' privilege leave, from India. Veterinary Surgeon Haslam has returned to India, having been pronounced by his Medical Board fit to serve in that country.

Owing to the heavy demands on the Veterinary Department, the Secretary of State for War has sanctioned the retention of four supernumerary veterinary surgeons for the present. This will absorb all the supernumeraries caused by the inexcusable reductions in India; so that, as vacancies now occur, candidates will have an opportunity of obtaining admission to the Department.

A General Army Order has been issued, notifying that for all officers, including those of the Department, the tour of foreign service has been extended from five to six years.

Obituary.

THE Army Veterinary Department has had the misfortune to lose no fewer than four of its officers in less than eight months, the last death occurring on April 16th, when John A. Rostron, M.R.C.V.S., 2nd Life, died suddenly at Windsor, from disease of the heart. The deceased officer graduated in 1864, and joined the army in 1867. He served for several years in India and at home in the Carabineers and 5th Lancers, and when the present Principal Veterinary Surgeon was transferred to the War Office from the 2nd Life Guards in 1879, Mr. Rostron succeeded him in that regiment. With the Household Cavalry he served in the Egyptian Campaign of 1882, and was present at the engagements of El Magfar and Mahsameh, and two actions at Kassassin and the battle of Tel-el-Kebir, for which he received the medal and clasps and bronze star. By everyone who knew him he was greatly esteemed; and by those who were most intimate with him, and were cognisant of his goodness of heart and sterling worth, he was considered as more than a friend. Among his brother officers of the 2nd Life Guards he was regarded with feelings of affection, and his untimely and painfully sudden demise caused deep sorrow among them, as it has done among his numerous friends. When his body was removed from the Windsor Cavalry Barracks to the Great Western Railway station in that town, for conveyance to Bolton, his native town, it received full military honours, the whole regiment attending, and the band playing the Dead March in *Saul*. No higher tribute could

be paid to one, who by his conduct and manner, had well earned it. Mr. Rostron became a Fellow of the Royal College in 1881.

The following deaths have been reported:—

S. Sparrow, M.R.C.V.S., Cambridge, graduated in 1834.
J. Markham, M.R.C.V.S., Rugeley „ 1839.
J. Jones, M.R.C.V.S., Leintwardine „ 1853.

On April 4th, William Boyce, eldest son of William Barrow, Esq., Veterinary Surgeon, Newmarket, aged forty-one.

Parliamentary Intelligence.

House of Commons.

PLEURO PNEUMONIA IN CATTLE.

On March 9th, Mr. Walter Long, in reply to Mr. Hozier, who asked whether the proposed committee of inquiry into Pleuro-pneumonia in cattle was to be empowered to conduct practical experiments, with the view of ascertaining the value of inoculation, and, if not, why not, said that no definite answer could be given until the committee was formed. It was for the committee to decide what evidence was necessary to enable them to come to a sound conclusion.

Notes and News.

Extracrdinary Vaccine Gestation.—We have been informed, says the *Journal of the National Agricultural Society of Victoria*, of a remarkable case of length of time of gestation in a cow which occurred lately at Toorak. The period extended from 23rd February, 1887, to 14th January, 1888, or 325 days, a heifer calf being produced. According to Mr. Tessier, an accurate observer for over forty years, who gave the results of over 575 cows, the longest period of gestation was 321 days, the mean time being 303 days. Earl Spencer also carefully tabulated a record of 766 cows, the least period of which was 220 days, the mean 285 days, and the longest period 313 days. He stated that he was able to rear no calf produced at an earlier period than 240 days. The longest period hitherto recognised by authorities as that at which a sound calf might be produced, was that given by Mr. Tessier of 321 days, but Australia now beats the record at 325 days.

Bequest to the Royal Veterinary College.—Lord Northwick has left a legacy of one hundred pounds to the Royal Veterinary College, London.

The Urea Centre.—In the animal economy, centralisation is carried to its most extreme degree. It is certain, from Brown-Séquard's experiments, that there exists a centre, irritation of which can suspend the chemistry of the body, making the blood in the veins flow red and reducing the temperature of the body. MM. Sée and Gley, experimenting on dogs with a view to producing glycosuria, caused azoturia by irritating the central end of the divided right vagus with a mixture of glycerine, water, and lycopodium, injected into that part of the nerve after section.

Swine Plague.—Swine Plague appeared in Sweden for the first time towards the end of last year, and, in spite of the very active measures adopted for its suppression, it still lingers in the districts into which it was first introduced.

A Prolific Ewe.—Early in March, on the farm of Mr. J. Tracey, near Queenstown, a ewe gave birth to five lambs. This prolific animal had also

five lambs at one birth last summer, and during the past five seasons gave birth to twenty-two lambs—an unprecedented occurrence.

SPURIOUS SUPERFŒTATION IN COWS.—A writer in the *Live Stock Journal* sends the following:—It may be interesting to your readers to hear of a most unusual, and I think I may say extraordinary, birth of two calves from a Jersey cow in my herd. This cow has produced a cow and bull-calf at an interval between of three weeks, the cow calf being dropped on March 9th, and the bull-calf on the 2nd April. On examining the stockman's service-book, there is recorded against this cow but one service, on the 22nd June, 1887. When the cow-calf was dropped, on the 9th March, we assumed that it was three weeks too early. The cow curiously took very little notice of the first calf, and she yielded no milk till the day the second calf was dropped. Both calves are well formed, the first calf being smaller, but quite as large as could be expected from a calf produced three weeks before time, the second calf a full-sized strong calf. Both calves and dam also are doing well.

VETERINARY SURGEONS IN BELGIUM.—In Belgium there are 521 veterinary practitioners, of whom 242 are in the Government service, 217 in general practice and in the army, and 62 belong to the class designated as Maréchaux Vétérinaires or Farrier Veterinarians.

AN AGED VETERINARY SURGEON.—The *Semaine Vétérinaire* states that there is now living at Ville-Evrard, a *confrère*, M. Renandin, who is 104 years of age, is in good health, does not smoke, and can read without glasses. He was present at the battles of Leipzig and Waterloo.

FECUNDITY IN SHEEP.—It has been recently reported that a half-bred ewe, the property of Mr. G. J. Bell, The Nook, Ithington, produced no fewer than six lambs, all of which were matured and of ordinary size. The first two are alive and well, but four of the prolific birth were born dead—a fact that is attributed to protracted parturition. A few nights later a Shropshire ewe, belonging to the same gentleman, produced four lambs, all living, and two half-bred ewes gave birth to triplets each. The lambs are all sired by Shropshire rams. This is not unlike an American item of news!

A RICH VETERINARY SURGEON.—The value has been declared at £45,711 of the personal estate of the late Thomas Jex, of 15, Victoria Street (formerly veterinary surgeon of the Scots Greys and the 1st Life Guards), who died on the 15th of February last. It need scarcely be remarked that Mr. Jex did not acquire his fortune while in the army, but after he retired, by becoming a wine merchant.

STAMPING OUT CONTAGIOUS PLEURO-PNEUMONIA IN THE UNITED STATES.—In an interview with Mr. J. W. Gadsden, M.R.C.V.S., of Philadelphia, an authority on Pleuro-pneumonia, he said that the United States owed a great debt to Professor McEachran, of Montreal, for the manner in which he had worked to stamp out this dangerous contagious disease, which up to now had cost the Government nearly 1,000,000 dollars in damages for cattle destroyed. In 1879 Professor McEachran went through the States inquiring and collecting facts on the subject. He then laid the information he had collected before the United States Government, which, owing to his earnest and convincing arguments, and in anticipation of the dire results likely to ensue if the disease were not speedily got rid of, caused proclamations to be made in the different States where it was prevalent, ordering that all animals suffering from it be destroyed and compensation made to the owners. This was done. In Maryland over 3,000 head of cattle were destroyed, for which compensation to the value of 75,000 dollars was paid. In New York and other States this sum has been exceeded, so that it will be seen what a great work Professor McEachran has done. The only State remaining to be similarly dealt with was Pennsylvania, but a law similar to those in existence in the other States came into operation there on April 9th.

REPORTED CURE FOR PLEURO-PNEUMONIA.—The Hungarian Minister of Agriculture has officially informed all agricultural societies that the manager of the spirit distillery at Raab, Herr Leopold Mandl, has discovered a remedy against Pleuro-pneumonia. The matter has been examined scientifically and practically, and the remedy is stated to have been found to be an efficient preventive against this destructive disease in cattle, while it is harmless to men and animals. The loss to Hungary from this disease has of late amounted to fifteen million florins yearly.

THE VALUE OF LIVE STOCK.—An American has computed the value of live stock in the United States at 1,279,560,190 dols., which is more than the combined value of the stock of all other countries. Russia and Great Britain each have 80,000,000 dols., Germany, 60,000,000 dols., and Austria-Hungary, 35,000,000 dols.

Correspondence.

ANIMAL TUBERCULOSIS.

SIR,—In reference to the subject of the address by Principal Walley on Animal Tuberculosis at the meeting of the Medical Chirurgical Society of Edinburgh, on February 16th, 1888, I beg to send you some observations appertaining to it.

It seems to me that the agitation about this epidemic in cattle is now about the stage that the one on Consumption in the army was some thirty to forty years since—the stage of discovery and astonishment by the public at its great prevalence, though everybody in the profession knew it well, but did not openly denounce it. Very similar sanitary measures may likely require to be taken now with our domesticated cattle, as then with the circumstances of our affected soldiers and sailors.

The stables and byres will represent the barracks of old, and they will require to be purified by scientific ventilation, and maintenance of cleanliness and purity by disinfection, and by free admission of light and air.

The onus of remedying the evil will rest on the veterinary profession; and the medical, which has done its duty by its affected subjects, may freely tender its advice and assistance.

The *crux* of the question appears to me not to lie in the correction of modes of transmission of the virus of Tuberculosis, but in adopting effectual methods of suppressing it at the fountain head.

This may only be done by applying modern hygiene to domesticated animal life, as successfully as it has been done to human life in our large towns and public establishments.

Consumption has now been effectually got under in the public services, and the horrors of the old barrack rooms and men's rations no longer exist as they did, when our *élite* of the Foot Guards were decimated by its ravages.

The citadel has not yet been attacked in force by the veterinary profession, and only the outposts have been skirmished with as yet.

The ventilation will require to be made independent of stablemen, by means of shafting; the scavenging and watering will need regular attendance, and exuvia cleaned up at once. Exercise should also form a part of the discipline, and cows should be taken out regularly, and walked about the yards or paddocks, instead of being tied up all day. More windows in the buildings will be wanted also; in fact, the means of amelioration of living are at present a manual full, and quite unapplied as yet, for the public benefit.

It may hopefully be intimated, that the epidemic will subside when unitedly

attacked, for here we have not to fear being undermined by affected food, as in man. The animals diseased are not carnivorous, but herbivorous; so the vegetable food may not yet lie under suspicion of transmission of the virus by adulteration or degeneration.

The origin and nursery of this Animal Tuberculosis will, therefore, presumably be owing to virtual ignorance, or neglect of domestic hygienic rules, as applied to animal life in general.

Pamphlets might be circulated amongst stablekeepers and dairymen stating these, the evils of their violation, and the benefits of acquiescence in the recommendations of the authorities in veterinary science.

W. V. BLACK, F.R.C.S.E., *Surgeon-Major.*

United Service Club, Edinburgh, *March*, 1888.

BOVINE AND HUMAN TUBERCULOSIS.

(The following letter on this subject appeared in *The Lancet* for April 7th.)

SIRS,—The letter of Dr. Creighton in *The Lancet* once more draws attention to the most important subject of Bovine Tuberculosis, and its relationship to Tuberculosis in mankind and other creatures. There is no need, in discussing such a serious matter, to wrangle about whether the medical or veterinary profession initiated investigations into the communicability of the disorder. Since the end of the last century veterinary surgeons have been observing and studying its manifestations in cattle, and early in this century had arrived at certain conclusions with regard to it. For more than a hundred years the flesh of Tuberculous cows has been looked upon with suspicion, and at different times in some continental countries laws have even been passed forbidding its sale for human food. The milk of Tuberculous cows has also at times been condemned, though not altogether because there was any supposed danger attached to it, but because it was poor in quality. Dr. Creighton is right, so far as I know, in ascribing to Klencke the first published notice of the communicability of the malady to mankind by means of the milk of "scrofulous" cows. But the evidence rested only on clinical observation, and though the cases he adduces appear to warrant the conclusion he arrives at, and though, also, in recent years similar observations have been made public, yet they are not absolutely convincing that the human species can be, or has been, so infected. But clinical observation and most careful experiments on animals have gone far to demonstrate that infection of mankind by the flesh and milk of Tuberculous animals is possible—nay, very probable. And in this demonstration members of the veterinary profession have played a very important part, though Villemin, of the Val de Grâce Hospital, Paris, in 1865, and again in 1866, led the way in experimental investigation. Soon afterwards Gerlach, then principal of the Hanover Veterinary School, undertook a series of experiments, which were conclusive as to the communicability of the disease to various species of animals. At the same time (1868) Chauveau, then at the Lyons Veterinary School, instituted experiments which had the same results as those of Gerlach, and proved beyond doubt that the disorder could be conveyed not only by inoculation, but also through the digestive apparatus. Chauveau was, I believe, the first to indicate the danger of allowing the flesh of Tuberculous cattle to be utilised as human food. The veterinarians, Harms, Günther, Bollinger, Bagge, Zürn, Semmer, St. Cyr, Jolin, Leisering, and others, experimenting in the same direction, all reached the same conclusions, and, with Toussaint of the Toulouse Veterinary School, undoubtedly showed that flesh and milk were infective.

So strong and so startling was the evidence thus accumulated, and so

alarming did the matter appear with regard to the public health, that in the *British and Foreign Medico-Chirurgical Review* for October, 1874, I called attention to its urgency, gave the chief facts—clinical and experimental—recorded up to that time, and concluded the paper as follows:—"From what has been already ascertained, there is every reason to view with grave suspicion the use of the flesh of Phthisical cattle as food, especially if the disease is much advanced and the tissues are generally involved. But with more reason the milk from cows affected with Tuberculosis should be prohibited, more particularly for the use of infants, who mainly rely upon milk for their sustenance, and whose powers of absorption are very active. Even if this milk did not possess such dangerous infective properties, its deficiency in nitrogenous matters and in fat and sugar, and the increased proportion of earthy salts, would alone render it objectionable as an article of diet. It has long been known that it was liable to produce Diarrhœa and Debility in infants; but though many children fed on such milk may have died from general or localised Tuberculosis, the part probably played by this fluid in its production has not been suspected." Since that time I have seized every opportunity of insisting upon the danger of Tuberculosis in cows, in the VETERINARY JOURNAL, in public addresses, and especially in my work on "Veterinary Sanitary Science and Police" (vol. ii.), published so long ago as 1875, I have earnestly endeavoured to point out the destructiveness of the disease among cattle, and the peril to which its extensive prevalence exposes our own species. In the report which, in conjunction with Dr. Lydtin, Principal Veterinary Surgeon of the Grand Duchy of Baden, and M. Van Hertsen, Chief Inspector of the Brussels Abattoir, I drew up for the International Veterinary Congress held at Brussels in 1883—which report was translated and published in London in that year, entitled "The Influence of Heredity and Contagion on the Propagation of Tuberculosis"—the injurious effects of the consumption of flesh and milk are fully considered, and the question viewed from a sanitary standpoint. To settle the question conclusively, and bring its serious aspect forcibly home to every mind, we require undoubted evidence of human infection from diseased cattle, and without resorting to experimentation on man, there will always be doubt. But to mention this test is to be condemned as a monster. At the first meeting of the National Veterinary Association, held in London in May, 1883, and at which I had the honour to be president, the subject of Tuberculosis was discussed, and in the course of my observations I remarked: "A great difficulty we meet with is that, while we can experiment upon animals to prove the transmissibility of the malady from one to another, we cannot do so with regard to the human species. It has struck me that we sometimes waste human life—that we throw away very good opportunities for experiment by the manner in which we dispose of our criminals. I think no better use could be made of those condemned to death than by experimenting on them in this direction. We know that if animals be fed for a certain time with tuberculous matter serious alterations will take place in their bodies, although they may appear to be in perfect health. I do not know whether the hyper-sentimental people, the extreme moralists of this country, would tolerate such a proceeding; but I do think that criminals who so far offend against society as to take away human life should be thus made to atone to society, whose moral principles they have violated. Feeding, or even inoculating, such criminals with the products of Tuberculous animals, in order to discover whether, after execution, such matters have produced in them the pathological alterations noticed in creatures so treated, would decisively, and for ever, solve a most serious sanitary problem." Without such a test, I fail to see what conclusion the Congress which meets in Paris this year to consider the subject can arrive at, beyond what has been already established. The disease is terribly

prevalent in cattle, as everyone knows who frequents slaughter-houses or cowsheds, and it is on the increase, our very choicest breeds being greatly involved. Unless legislative measures are promptly introduced to limit or suppress its ravages, it will cause fearful havoc among our live stock, if it does not ultimately exterminate it. GEORGE FLEMING, F.R.C.V.S.,
March 27th, 1888. *Principal Veterinary Surgeon of the Army.*

THE VETERINARY AND MEDICAL SCIENCES.

SIR,—The editors of *The Lancet*, in a recent number of that journal, drew attention to the necessity for the co-operation of veterinarians and medical practitioners in matters relating to disease, especially as to "optical appearances of morbid or healthy tissues in our domestic animals."

They say that "much that is known as to the pathology and etiology of the diseases of the lower animals, as they affect man by way of food or otherwise, has been the result of the labours of officers of health and other medical men under whom the inspectors work; and that, even at the present juncture, when such questions as the development of Scarlatina from a bovine disease, or the relation of bovine to human Tuberculosis, have arisen, it has been members of the medical profession who have taken the initiative in studying and discussing the subject."

Under the qualifying condition they mention, viz., in the case of Scarlatina studied in England by *specialists* in the medical profession—who are evidently at loggerheads with each other, even up to date, regarding the opposite conclusions reached—we are in entire agreement with them; but we should add, that much that is known as to the pathology with regard to at least one of the maladies mentioned, namely, Tubercle in animals, has been the result of the labours of veterinarians, on the Continent especially. Besides, we strongly object to the practice under which medical men are allowed—as in the army—to pass carcases as healthy food for soldiers, under existing regulations, especially such officers as have had no practical, or even theoretical, knowledge as to the optical appearances of morbid or healthy tissues *in our domestic animals*. What, for example, can be a more unpardonable act of heedlessness than the incautious way of trusting young surgeons, or even physicians, to do the work of veterinarians? Yet the above practice is actually authorised by order, against which even reasoning such as *The Lancet* would, we fancy, support, availeth naught. What, for example, would *The Lancet* say if a man suffering from some specific disease of the eyes, were to be sent to the general practitioner for operation when an ophthalmic surgeon was near by?

It is much to be feared that veterinary science is only too often divorced from the medical, with a singular lack of appreciation regarding the difference between specialists and general practitioners, and between general practitioners and general practitioners in the "two" professions. Because medical men are leading bacteriologists in England, that is no reason for supposing that veterinary science, as a specialty, is not necessary, and an integral part of medical science, and *vice versâ*. It is absurd, on the face of things, to speak of either science as independent of the other. Bacteriology, indeed, has an interest of its own, as it owes its origin to continental scientists chiefly, and has only now, as it were, begun its development in England. We may add, however, on the very highest authority in England, that its application to a *very* few diseases is as yet possible, and that for all other diseases attributed to bacteria, we are, for all practical purposes—"as you were!" "A READER."

India, *February 29th*, 1888.

OPERATION FOR SIDE-BONES.

SIR,—In the VETERINARY JOURNAL of last December I read with very great pleasure Mr. F. Smith's paper on "A New Operation for the Cure of Lameness arising from Side-bones." At that time I was treating an aged cart-mare with very large Side-bones and bad contracted heels, which made her exceedingly lame. I had fired and blistered the foot without the least benefit. I at once made up my mind to try Mr. Smith's treatment, and operated on her as described in his paper, telling the owner to work her daily. I was astonished to find, in less than two weeks, that she was walking perfectly free from lameness, and in one month from operating on her she trotted sound.

Since then I have operated on numerous horses with Side-bones with success in every case. One case especially was that of a five-year-old cart-mare, going dreadfully lame from a very small Side-bone. She had been blistered several times and fired, and had six months' rest, but still she remained as lame as ever. I operated on her, and in three weeks she trotted sound.

I notice, in the discussion on Mr. Smith's lecture at the Southern Counties Veterinary Medical Association, that several veterinary surgeons did not believe that the horse's foot expanded. I can quite substantiate Mr. Smith in saying it does. I have found, as he has, that after sawing through the wall of the hoof, then filling up the cracks with soap, and walking the horse a few yards, the soap squeezed out, which is good proof the foot does expand. I trust that all those veterinary surgeons who have not tried Mr. Smith's treatment for lameness caused by Side-bones will do so, and I can safely say they will meet with success.

HARRY A. BARRETT, M.R.C.V.S.

Nuneaton, *16th April.*

VACCINATION AS A PREVENTIVE OF CANINE DISTEMPER.

SIR,—At a meeting of the Yorkshire Veterinary Medical Association, Mr. Briggs, of Halifax, initiated a discussion on the above subject, having previously alluded to it in the Journal of last month.

It would seem that the disease known as Distemper in the dog has as much relation to Variola as the intestinal lesions of Typhoid have to a compound fracture of the patella—Variola, on the one hand, being a specific eruptive fever; Distemper, an influenzoid affection, not characterised by any eruption, and totally different in its course and terminations from any variety of pock. No definition of Variola, human or animal, is complete without special reference to the character and phases of the eruption, the individual lesions of which, in all cases, tend to the production, successively, of a vesicle, papule, pustule, and scab. If this sequence is in any way curtailed, as it is said to be in Variola ovina, the presence of an eruption, at least, is in all instances constant.

Notwithstanding, however, the palpable differences in the nature of the two diseases, it seems yet within the bounds of reason to suppose that the specific poison of Variola may so react upon the tissues of the dog as to render them unsuitable pabula for the development of the morbific material of canine Distemper.

If, however, this hypothesis is tenable—and I question very much if it is—would it not be more reasonable to expect that inoculative material, taken from a case of the disease itself, would be more likely to prove inoculatory efficacious than the virus of a different disease? From what we know, relatively, about inoculation and its results in kindred diseases, this would seem probable.

From the evidence at present at our disposal it is impossible to arrive de-

finitely at a conclusion one way or another, and the state of the case seems briefly to be this: That, on the one hand, it is not absolutely impossible that the vaccine lymph may prove protective against Distemper, and, on the other hand, it is highly improbable that such apparently distinct diseases can exercise any protective influence with regard to one another. Further than this, that certain people claim for the operation the most satisfactory results, without, however, recording whether or not, succeeding their inoculations, they produced the vesicles proper to the success of ordinary vaccination.

Pending the advent of more reliable data, one necessarily looks upon the question in a spirit of agnosticism; the beneficial results vouched for by persons of integrity being simply, as Mr. Briggs suggests in his letter, the result of baffling coincidences. There seems, latterly, to be a tendency to rather overdo the germ theory, and give us too much of a good thing. But there are stranger things in heaven and earth than are dreamt of in our philosophy.

FITZ-EASSIE, M.R.C.V.S.

"MR. GREAVES AND THE BOARD OF EXAMINERS."

DEAR MR. EDITOR,—Would you kindly afford me a little space in your journal to reply to some misleading assertions which have been distributed among the members of the profession, by means of a circular with the above title.

Let me first of all frankly acknowledge that I was the examiner to whom reference is made in the circular as having asked the student, who was accorded a second examination, the question, "What is Ectopia Cordis?" So far the assertion is correct, but immediately following I find the author of the circular says: "The student had neither it explained in his lectures nor read of it in his text-books, and consequently could not answer the question, and was of course floored." If the student had neither heard of it in his lectures nor read of it in his text-books, then it must have been on account of absence from or inattention to these lectures; as his teacher distinctly avers that he was taught it, and the same may be said as to his text-books; if he did not see it there, it was for want of looking. It does not follow that the student was at once "floored," as that was certainly only one of many questions.

This subject, however, will bear some explanation. The student had a most patient and painstaking examination, and in his practical examination showed lamentable ignorance of the most elementary details. The subject of his morning examination having been talked over with his Principal, that gentleman said that my questions had been certainly very simple, and that probably it was on account of their simplicity that he had failed. He (the Principal) could assure us (the examiners) that the student answered well in class, that he was well read, and more than an average student, particularly in our subject; that if we would ask him something out of the common, we would be sure to get answered. My late colleague was equally dissatisfied with the answers he had received, but as the other examiners had been satisfied, it was agreed to accede to the Principal's request that he should have another examination from us.

But for the Principal's statement, the question would not have been asked, not because an answer was not to be expected, but because the question was of so little practical value that I never asked it before or since. At the same time, I must take exception to the statement, "That very few medical men or veterinary surgeons ever heard of it," and I think that statement can only be attributed to the limited intercourse with veterinary surgeons or medical men of any standing which the author of the pamphlet holds that he has been unable to elicit a reply from any one better acquainted than himself with the literature or the *lusus naturæ* to be met with in our profession. I am sure, Mr. Editor, that were it necessary to trouble my late colleagues and

the Principal of the school on this subject, they would all bear me out in statement of facts with regard to the examination of the student referred to. Those who are best acquainted with the pamphleteer will not be surprised at the charlatan method by which he seeks to further his candidature; but I feel confident that the profession will be quite capable of eliminating such dross from the pure metal at the forthcoming election.

ARCHIBALD ROBINSON.

P.S.—I may state that the student referred to failed at a subsequent examination to satisfy the examiners at a different table, and was again rejected.

MR. GREAVES' COURT OF APPEAL.

SIR,—I have often wondered why gentlemen possessing any feeling of self-respect would seek election as members of Council, or allow themselves to be selected as examiners of students, when I see the way in which they are treated by a certain set of persons in the profession, and especially of late years. The fine touch of irony in Mr. Kidd's letter in your last issue, embodied in his allusion to the "plums" which Councilmen and examiners gather from their office, is very amusing. I suppose these figurative plums are gathered at the annual meetings, when abuse is usually hurled at the luckless individuals who represent the Council by those who imagine their *rôle* is the very easy one of fault-finding with men who certainly do make somewhat heavy sacrifices for the profession, which their assailants take very good care to avoid. I have attended several annual meetings, and it has not been my good fortune to have ever heard a vote of thanks proposed for the Council for what it does during the year. Crack-brained, angular professors, and very clever (?) *talking* practitioners, consider they are distinguishing themselves by picking holes in Councilmen and examiners, and display what they fancy, no doubt, their transcendental abilities in doing so.

I might dilate much on this, but forbear, as my object now is to allude to a circular which I have received from Mr. Greaves, in which, while extolling what he has done for the profession, he asks me to give my vote for his re-election as a Member of Council. Now, I do not like such circulars, neither do I approve the tone of Mr. Greaves' one; but what renders his conduct very objectionable in the matter is the printed leaflet he encloses, in which are two subjects he had written on, and has had reprinted. One of these subjects is on the "Board of Examiners," and the other on a proposed "Court of Appeal" for rejected students. I only now refer to the latter, not with the object of showing how utterly ridiculous the proposal is, nor how contradictory and illogical are its terms, but to show how unfair Mr. Greaves can be when he is anxious to catch votes. He casts grave imputations upon the fairness and honesty of examiners, which I defy him to prove. He gives an instance, but before doing so he ought to have inquired into the facts of the case, for I assume he is ignorant of them, and of the circumstances in which a student was asked, "*What is Ectopia cordis?*" If he cares to inform himself, I fancy he will be sorry that he made any reference to the case. He says: "The student had neither heard it explained in his lectures nor read of it in his text-books, and consequently could not answer the question, and was of course floored. I find there are very few medical men or veterinary surgeons who ever heard of it. Now, I ask, is there either sense or reason in appealing to such a tribunal as this?"—meaning the Board of Examiners.

Now, sir, I must enter my protest against this imputation of ignorance on the part of medical men and veterinary surgeons. Mr. Greaves should not measure other people's knowledge by his own. *He* may never have heard of *Ectopia cordis*, but that should be no reason why others should not be familiar

with the designation which, to my ken, is known to many of my colleagues, and I am certain to all medical men. Not only this, but it is found in all veterinary and medical text-books which treat of certain branches of medicine. For instance, take veterinary literature. In my very small library I find the condition described by that name in Williams' "Veterinary Medicine," in Steel's "Diseases of the Ox," in Hill's "Bovine Medicine and Surgery," and in your own "Text-book of Veterinary Obstetrics" (p. 395), in which it is not only described, but a drawing is given of it.

In fact, sir, so common is the designation that a student who did not know its meaning well deserved rejection, as ignorant of his profession and illiterate; while the veterinary surgeon who had never read of it—well, I should think he would make a very distinguished member of Mr. Greaves' Court of Appeal, and a good illustration of the kind of intelligence of those who attempt to traduce the reputation of the profession for the sake of obtaining votes from its members. When gentlemen are so anxious to display their ignorance of professional knowledge, as in this instance, what might we expect the Court of Appeal to do sometimes? I think it is a thousand pities that Mr. Greaves did not show his Court of Appeal effusion to some kind friend who understands scientific phraseology, before it was sent to the printer. The profession would have been spared a painful blush, and its enemies much amusement.

F.R.C.V.S.

April 13th.

ANSWERS TO CORRESPONDENTS.

AN EDINBURGH STUDENT.—The Royal College of Veterinary Surgeons has not yet decided, we believe, as to the Foreign and Colonial Schools whose graduates may be allowed to practise in this country. Some time ago a Committee was appointed to report on the subject. At present, no person who is not in the Register of Veterinary Surgeons can practise in the United Kingdom. To obtain the diploma of the Alfort School the full course of study would have to be gone through by a M.R.C.V.S.

J. B.—Apply to the Principal Veterinary Surgeon of the Army.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from Dr. Black, Edinburgh; A. W. Hill, London; A. Leather, Liverpool; J. A. Nunn, A.V.D., Natal; H. Gray, Calverton; P. Walker, Halifax; "A Reader"; E. A. W. Hall and R. W. Burke, A.V.D., India; F. H. Reeks, Spalding; J. McGavin, Montgomery; J. Malcolm, Birmingham; L. Browne, Edinburgh; T. Hopkin, Manchester; W. D. Fairbairn, Cupar; E. Hollingham, Tunbridge Wells; F. Smith, Aldershot; H. A. Barrett, Nuneaton; A. Leather, Liverpool; "An Edinburgh Student"; T. A. Smith, Calcutta; "J. B."; Fitz Eassie, York; A. Robinson, Greenock.

BOOKS AND PAMPHLETS: Successful Bee-keeping; *R. Schmalz*, Die lage der Eingewiede und die Sektions-Technik bei dem Pferde; *A. Sanson*, Alimentation raisonnée des Animaux Moteurs et Comestibles; *A. Peters*, The Value of Veterinary Science to the State.

JOURNALS, ETC.: *Archiv für Wissenschaftliche und Praktische Thierheilkunde; Der Thierarzt; Wochenschrift für Thierheilkunde und Viehzucht; Recueil de Médecine Vétérinaire; Lancet; British Medical Journal; Animal World; Echo Vétérinaire; Hufschmied; Edinburgh Medical Journal; Journal of Comparative Medicine and Surgery; Gazetta Veterinaria; Annales de Médicin Vétérinaire; Clinica Veterinaria; Journal de Méd. Vétérinaire; Revue de Médecine Vétérinaire; Veterinary Review; Live Stock Journal; Tidskrift für Veterinär Medicin; American Live Stock Journal; Journal of the Agricultural Society of Victoria; London Medical Record.*

NEWSPAPERS: *The Scotsman; Baltimore Sun; Montreal Herald; Glasgow Herald; South-Eastern Gazette.*